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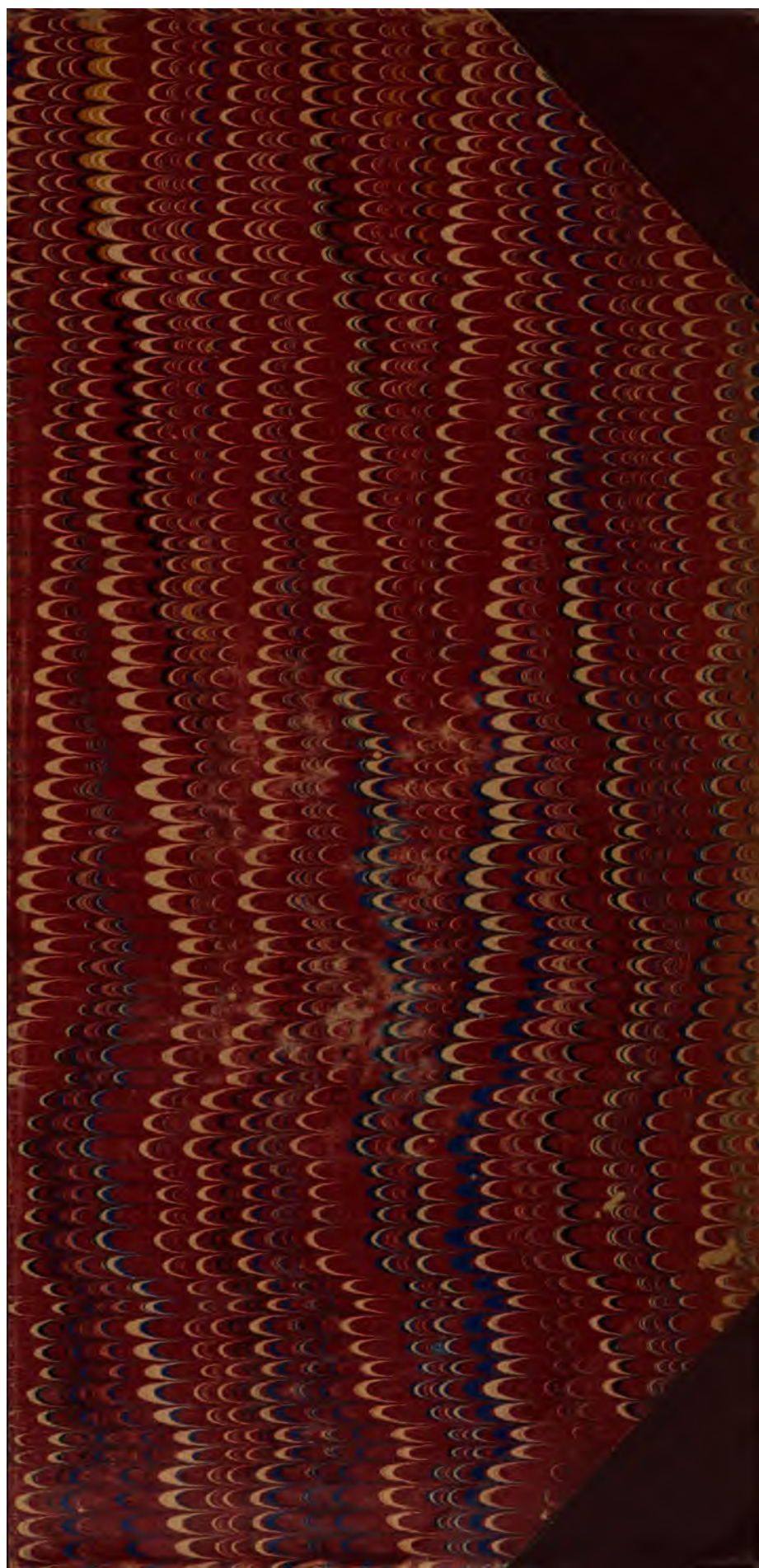
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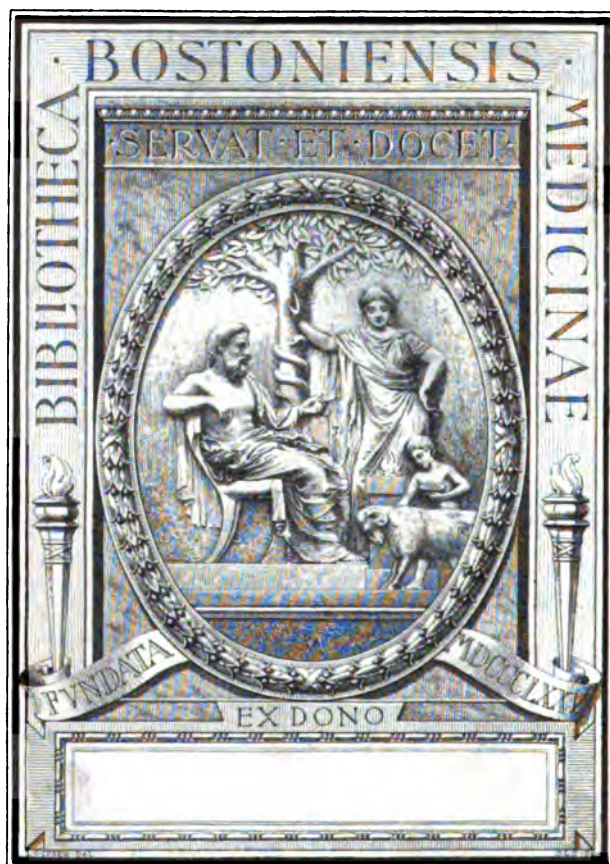
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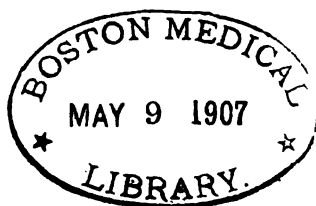
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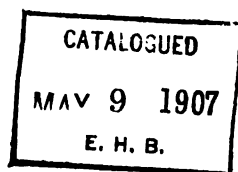
DR. A. HARTMANN AND DR. U. PRITCHARD
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¹ Brandegge's article to appear in No. 5. Eagleton's in No. 6.

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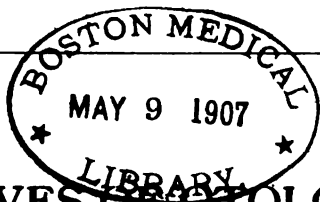
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ARCHIVES OF OTOTOLOGY.REPORT OF A CASE OF TEMPORO-SPHENOIDAL
ABSCCESS, WITH STREPTOCOCCUS INFECTION.
OPERATION AND RECOVERY.¹

By FRANKLIN M. STEPHENS, M.D.,

ASSISTANT AURAL SURGEON, NEW YORK EYE AND EAR INFIRMARY.

ON October 1, 1901, or more than three years ago, the case was admitted to the New York Eye and Ear Infirmary in the service of my chief, Dr. Gorham Bacon. Three days later I operated upon him for mastoiditis, and twenty days thereafter for temporo-sphenoidal abscess.

The patient, Isador U——, age twenty years, Roumanian by birth, and by occupation a purse maker, came to the clinic, and after examination was sent to the ward, where the following family and personal history was elicited:

Father and mother living. Father aged fifty-one, and mother forty-one. One sister living in Europe, and in good health so far as known. Three children of the family, all sisters, died in infancy: one twelve days after birth, one two days, and the other lived less than twenty-four hours. These three births were all premature—about eight months—and, other than the imperfect development of that stage of gestation, appeared healthy. The living sister is the eldest child, and the patient himself the fourth of the children. The father and mother have always been healthy.

The patient had always been well, with the exception of slight ailments, the exact nature of which could not be obtained, and an attack of the measles when thirteen years old. Never had any ear trouble until thirteen days prior to admission, when he began to have pain in the right ear. It came on in connection

¹Read before Section on Otology, New York Academy of Medicine, November 10, 1904.

with a severe head cold, and the pain was continuous. Worse at night than during the day, and of such severity as to prevent his getting much sleep. Some headache and tinnitus, and at times slight vertigo. There was no discharge from the ear.

Examination.—Canal clean and wide, so that a view of tympanic membrane was easily obtained. The drum was red and bulging, especially in Schrapnel's membrane, and most marked in anterior superior quadrant.

There was a general diffuse tenderness on pressure over the entire mastoid process. Not much more marked, if any, over antrum and tip than on other portions of the surface. The temperature was 100°; pulse 90; respirations 20. No history of a chill. Tongue heavily coated. Breath fetid and bowels constipated.

Treatment.—The patient was put to bed. The drum was freely incised under nitrous-oxide anæsthesia, and a few drops of creamy pus came away, the bacteriological examination of which showed an abundance of streptococci in long chains. The ice-coil was applied, and kept on for thirty-six hours, and the ear irrigated with a warm 1:5000 bichloride-of-mercury solution every three hours.

Oct. 4th.—Patient complains of persistent frontal headache. Tongue is still heavily coated. Mastoid tenderness if anything more marked than when first seen. No discharge from the canal, the incision in the drum, which was still bulging, having closed. Temperature 99.4°; pulse 80; respirations 20. Owing to a continuance of the symptoms, and the bacteriological examination having shown streptococcus infection, the mastoid operation was determined upon.

Operation.—The usual curvilinear incision was made from the tip to a point three quarters of an inch above the posterior root of the zygoma. At right angles to the middle of this, and extending backward for one inch, another incision was made. The flaps were then retracted, exposing a well developed and broad mastoid process, a large area of which in the central portion was of a dark bluish color. The cortex was now chiselled away, revealing the fact that the process was of the pneumatic variety. The bone was very much congested, and the bleeding more profuse and uncontrollable than in any mastoid I have ever operated upon. The bone seemed to be softened, and the cells apparently filled with granulations. No demonstrable pus was,

however, seen. The entire cell structure was obliterated, and the tip taken away. The sigmoid sinus was not exposed. A small area of the dura over the antrum was uncovered, but owing to the persistent hemorrhage it was not possible to determine much as to its condition, but it was apparently healthy, and I had seemingly operated through a mistaken diagnosis. The wound was now flushed with alcohol, packed and dressed in the usual way. Time of operation forty minutes.

The course of the case from October 4th, the date of the operation was uneventful, except that on the 8th the temperature went up to 102.4° . It then receded slowly to normal, and again on the 13th it went back to the same elevation, and again slowly came down to normal. Granulations sprang up rapidly and were perfectly healthy. The wound was free from pus. The patient complained from time to time of pain in the wound and almost continuous frontal headache. The heavy coating of the tongue continued, as did the fetor of the breath, which I sometimes think is almost characteristic of a streptococcus infection. His appetite was poor, bowels constipated, and were moved only when given calomel followed by a saline. On October 16th, at 6 A.M., the pulse dropped to 60. At 9 A.M. it was 70. Up to that time it had been ranging from 70 to 90. It continued at 70 and above until the 19th, when again at 6 in the morning it dropped to 60. At 3 in the afternoon it was 82. On 20th, 21st, 22d, and 23d, it was frequently down to 60 per minute, and the maximum was 70. The temperature from the 20th to the 24th did not go above 99° , and respirations were 18 and 20. On the 21st, it was noted that he ceased to complain of anything and was inclined to sleep a great deal. On the 22d he was even more drowsy, but when aroused took his nourishment, and cerebation was clear. Answered questions properly, but seemed desirous of passing off to sleep again. On the morning of the 23d, after a continuous night of heavy sleep, he had an attack of projectile vomiting. Three times during that day the pulse went down to 60 per minute. When left alone, the patient slept continuously. When aroused, took his nourishment and properly answered questions, although cerebation was then noted to be slow.

Examination of eye-grounds on that date revealed the fact that he had double choked disk, more marked on the left than the right side. October 24th: Again had an attack of projectile

vomiting and was more stupid than the day before. The optic neuritis had increased. Temperature normal. Pulse varied from 60 to 68 per minute. Respirations 18. Bowels constipated.

At this time Dr. Bacon saw the patient with me, and we decided that operation was imperative. He was then taken to the operating-room and placed under ether anæsthesia, but little ether, however, being required. The wound of previous mastoid operation was opened and all of the new-formed granulation tissue quickly swept away. The former posterior incision was lengthened about one inch. The original curvilinear incision was carried upward and then forward to the region of the temporal artery. The flaps were now retracted, and the periosteum rolled back, making a free exposure in the region of the temporal ridge and the squamous portion of the temporal bone. The posterior bony canal wall was now taken away with rongeurs, the tympanic ring cut through, and the primary mastoid operation converted into a radical one. The tympanum was now curetted free of the ossicles and its granular contents. The exposed small area of dura over antrum of former operation was enlarged by removing the remainder of the tegmen antri, cutting down the auditory plate, and removing the tegmen tympani and a portion of the squamous portion of the temporal bone above, exposing in all an area of dura about the size of a half dollar. It was then observed that the dura was covered with granulations where the tegmen tympani had been taken down. The inflamed area was about the size of a dime, and the dura surrounding this area was to all appearances perfectly normal. The wound was now flushed with 95 per cent. alcohol and carefully dried. A freshly sterilized bistoury was next introduced through the inflamed area of dura into the temporo-sphenoidal lobe, and the incision carried directly upward for three quarters of an inch. On the withdrawal of the bistoury a small amount of pus flowed out. The incision in the dura was now lengthened to a full inch, a closed forcep was next introduced and the blades separated, which resulted in a free flow of thick, creamy, odorless pus. Gentle pressure was now made over the exposed brain area, and by that means the entire contents of the abscess cavity was evacuated. The quantity of pus removed was estimated to be at least three ounces. The distance from the dura to the inner wall of the cavity was about two inches, so that the pus must have been in close proximity to the lateral ventricle. A culture of the pus was made,

and streptococci only and in great abundance found. After evacuation of all of the pus a light wick of iodoform gauze was introduced into the abscess cavity, the remainder of the wound packed with iodoform gauze, and the usual external dressing applied. The patient was now returned to the ward and was in excellent condition. Time of operation fifty-five minutes. For twenty-four hours after the operation the patient was restless, slept but little, and complained of a great deal of pain in his head and in the wound region. The entire dressing having become saturated with blood and serum, the outer portion of it was changed. Temperature 100° ; pulse 80; respirations 20. That was at 12 o'clock the next day, and the temperature then recorded, of 100.8° , was the maximum following the brain operation. It never again reached 100° .

October 27th.—The entire dressing was removed including the packing within the abscess cavity. At this dressing there was a considerable quantity of pus. By the use of Dr. Frederick Whiting's encephaloscope and the light from a head mirror, the outlines of the cavity could be easily seen, and all of the pus clinging to its walls was carefully wiped away, and the wick of iodoform gauze again introduced. The external dressing was then applied, and the patient was comfortable. Maximum temperature for the third day was 99.8° ; minimum, 99° . Pulse 80; respirations 20. Mind perfectly clear. Took nourishment regularly and seemed to enjoy it. The wound was dressed again on October 29th and 30th, November 2d, 5th, 7th, 9th, and 12th. On November 12th it was noted when the dressing was taken down that the newly formed tissue in the cavity had pushed out the gauze wick, and it was lying in the tympanic cavity underneath the other dressing. As there was but little pus in the wound, the fact that the gauze had been pushed out was taken as an indication that the cavity was filled with new-formed healthy tissue and that it might be meddlesome interference with nature to force packing in again. So from that time on, or eighteen days from the date of operation, no further attention was paid to the brain portion of the wound, further than to carefully inspect it at each subsequent dressing. And from that time on the wound was treated the same as after any other radical operation. The course of the case from November 12th on to complete and perfect recovery was uneventful. The temperature, pulse, and respiration continued to be normal, or nearly so, and

the patient was discharged from the Infirmary absolutely well mentally, and physically, on December 5th, or two months and five days from date of admission.

I kept track of him for two years thereafter, and he continued in perfect health and complained of only one symptom, which, for want of a better name, I will call night-blindness. He stated that along toward evening he could not see to do his work well. I referred him to Dr. John Richards, who was then House Surgeon at the Infirmary, with the request that he make a careful study of the ocular condition, and thinking that the study would be an interesting one following a former known condition of choked disks. Unfortunately his notes were lost, and I do not know his conclusions further than that there were defective color sense and fields of vision. At a later period Dr. Alexander Duane saw the case, and I think refracted him. I saw the patient about two weeks ago, and am greatly disappointed not to have him here this evening. I took his address at the time, but there was some mistake, and I am unable for the present to produce the man. He is perfectly well. He visited Europe during the past year, and has learned to both speak and write the English language since the operation. Whether or not the eye symptoms referred to still exist I do not know.

In Conclusion.—I have to say, 1st, that which you all know, viz: That any abscess of the cerebrum or cerebellum is difficult to diagnose and hard to locate.

2d. That I found Doctor Frederick Whiting's encephaloscope in the treatment of the case of inestimable value.

3d. That neither at the time of operation nor at any subsequent period was there one drop of irrigating fluid of any kind introduced into the abscess cavity.

4th. As regards the use of the ice coil when the patient was first admitted to the Infirmary (that was three years ago), I would not now advise it, as I doubt if it ever does good in a case of streptococcus infection, and it may do harm in the way of masking symptoms.

5th. My theory in regard to the non-infection of the mastoid cells is that when the process first began in the tympanic cavity the muco-periosteal lining of the aditus became swollen and walled off the pus, and that it then passed upward through the tegmen tympani.

TWO CASES OF TEMPORO-SPHENOIDAL ABSCESS. OPERATION, RECOVERY.¹

By ROBERT LEWIS, JR., M.D.

CASE I.—R. C. was admitted to the New York Eye and Ear Infirmary on the 23d of January, 1901, and from her and her friends the following history was obtained. Since her childhood she has had an almost constant purulent discharge from the left ear. Ten months previous to my seeing her, during the cessation of the discharge, she complained of pain in the ear. An ice-coil was applied by her physician, and the pain subsided, with a return of the otorrhœa. The present attack began ten days previous to her application at the Infirmary with a "cold." The next day, she had some earache and tinnitus, headache on the side of the head affected, no dizziness, no vomiting, and the discharge stopped. Patient kept growing worse, and three days later complained of chilly sensations and of pain in her back. A diagnosis of the "grippe" was made.

On the fifth day the patient had a severe chill, which lasted twenty minutes, her teeth chattered, and she shook convulsively; temperature rose to 104° F., but was not followed by perspiration.

She had violent headache on the left side, the pain extending to the neck; however, the mobility of the neck was normal. Some vomiting (not projectile).

On the sixth day, 1 P. M., the patient had a chill lasting eight minutes, followed by a rise of temperature, and sweating, with much exhaustion; a second chill at 7 P. M., which lasted twenty minutes.

¹ Patients shown before Section on Otology, New York Academy of Medicine, November 10, 1904.

Two days later, she had another severe chill lasting twenty minutes, followed by fever and sweating, muttering delirium, and a tendency to drowsiness.

January 22d, the day before her admission to the hospital, a slight left facial paralysis was noticed; no chill on this day, but the patient was very weak. Amnesic aphasia appeared on this day. Drowsiness more marked. Answered questions rationally but very slowly. No convulsions at any time, and no slowing of the pulse. She used the word "fan" indiscriminately, calling her physician Dr. "Fan," her coat "fan," *et cetera*.

On admission, the physical examination showed mastoid to be slightly tender over the antrum, the tip, and the emissary vein; no œdema over the mastoid; a profuse and foul discharge from the auditory canal; a furuncle upon the posterior cartilaginous wall; no tenderness in the neck; no ocular paralysis; a slight general anæsthesia, though no difference between the two sides; knee-jerk normal; T., $103\frac{1}{2}^{\circ}$ F.; P., 108; R., 24.

Diagnosis: Mastoiditis; Cerebral Abscess. She was prepared for operation.

Operation: The usual curvilinear incision was carried forward so as to expose the entire squamous plate of the temporal bone, a third incision was carried from the curvilinear incision at the top of its curve, upwards and backwards.

The mastoid cortex was normal in appearance and of an ivory-like hardness; on opening the antrum a foul-smelling discharge appeared. The antrum was very large and filled with cholesteatomatous material. Bone necrosis extended downwards to the tip and backwards, so as to include the sinus wall; the sinus was exposed for about an inch, and was covered with a foul-smelling pus and with granulations.

The pus kept oozing out of the vicinity of the antrum, and on exploring with a probe it passed through the tegmen tympani and entered the cranial cavity some distance. On its removal a tablespoonful of thin, foul-smelling pus flowed out. The posterior and upper canal-wall was removed and the tympanic cavity was cleaned out.

Then the whole of the squamous portion of the temporal bone and some of the anterior inferior angle of the parietal bone were removed.

The exposed dura was blackish in spots and everywhere covered with lymph and bathed in pus. This extradural abscess

was situated fairly far forward and covered over the temporo-sphenoidal lobe. The brain pressure was plus over the temporo-sphenoidal lobe.

The scalpel was passed directly into the brain at this point and the incision carried upward and forward about three quarters of an inch. Pus and disintegrated brain material escaped. The size of the cavity was about that of a very large walnut, and was lined with a membrane.

The cavity was not irrigated but cleansed with pledgets of gauze. Sterile gauze packing used. The posterior incision as well as the third incision was closed with sutures. Firm pressure by means of the dressings and bandages was applied. The extradural abscess was walled off by adhesive inflammation from the healthy dura.

The operation was followed by little or no shock to the patient. The temperature following the operation was $98\frac{4}{10}^{\circ}$ F.; pulse, 100, good and strong. During convalescence the temperature never went above 100° F., and never below 98° F. During the week following, the patient was restless, at times noisy, and had retention of urine.

The facial paralysis was hardly discernible on the third day following the operation. The aphasia not so marked, but the patient complained of much headache; when the wound was dressed no irrigation was used, but the cavity wiped out with cotton pledgets soaked in weak bichloride solutions, and the wound packed with sterile gauze.

The wound was dressed every other day.

A month after the operation, the aphasia had entirely disappeared.

During the sixth week a small abscess developed in the anterior extremity of the wound. The patient was etherized and an incision made over the point of fluctuation, and a discharge of pus followed, and, on probing, a small point of necrosed bone was found. This was removed with the rongeur and curette.

The patient was discharged from the hospital at the end of two months. By the tenth week, epidermization of the tympanic cavity had taken place; the external wound had healed some time previously.

CASE 2.—C. M. came into my service in the New York Eye and Ear Infirmary in June, 1902. The aural history was one of long-continued otorrhœa. Shortly before admission she com-

plained of pain in the right ear; of tenderness over the mastoid process, and of a very excruciating headache, localized above and in front of the auricle. The usual radical mastoid operation was performed. The middle fossa was opened, and on exposure the dura mater over the anterior portion of the temporo-sphenoidal lobe was found to be very tense and injected. The dura mater was incised, and about three ounces of very foul-smelling pus flowed out. The patient did very well, and after about ten days wished to go home and take care of her infant of a few months. At the end of two weeks, as her progress towards recovery was rapid and she was noisy in her entreaties to be allowed to go home, consent was given with reluctance. She came to the clinic to be dressed during the following week, but as she failed to appear after that, a search was made for her at her home, where she was found in bed with a high temperature and in a semi-comatose condition; the dressings were disarranged and soiled; the temperature was 106° F. She was conveyed to the Infirmary as quickly as possible. Her condition was precarious. She was carried in on a stretcher and to the operating-room. The wound in the dura mater, which had completely closed, was reopened, and from it pus spurted out a distance of two feet. The cavity was found to be very large and dumb-bell in shape, and extended well up into the frontal lobe. It is likely that originally there were two abscesses, and that at the first operation the more superficial one only was evacuated. During the interval between the two operations, the second and more deeply situated abscess increased in size, and then ruptured into the cavity of the more superficial abscess, which in the meantime had closed because of the removal of the dressings. After the second operation the patient improved rapidly, and is now robust and strong.

THREE CASES OF LATERAL SINUS THROMBOSIS.¹

By ROBERT LEWIS, JR., M.D.

CASE 1.—Boy ; had suffered from a scanty, foul-smelling discharge from the right ear for three years. He never had had any medical treatment for the diseased ear. Eleven days before presenting himself he had complained of a nervous shaking, not a distinct chill, followed by severe pain in the head, and he had vomited five or six times. No dizziness. The patient was operated upon that same day.

Operation.—The incision through the skin over the mastoid process gave vent to the contents of a small subperiosteal abscess. Pus was also seen to be oozing from the bone itself, but no recognizable perforation was found. On removing the cortex considerable bleeding took place from the sigmoid sinus, the outer bony wall of which had in part been destroyed by necrosis. Possibly this bleeding may have been due to the tearing of abnormally firm adhesions which had formed between the sinus and its overlying bony roof. The latter was removed for a distance of 4 or 5 cm back from the knee, thus rendering it easy to control the hemorrhage. The surrounding bone was also removed as far down as the bulb. The sinus, which was then opened, was found to contain a greenish mass ; its inner wall was necrotic and discolored ; and the adjacent cerebellum bulged and seemed to be soft. It was punctured a number of times and a free flow of serum was thus obtained. Smears from these punctures were examined microscopically with a negative result. The radical operation was then performed and a large cholesteatomatous mass was removed from the antrum and tympanic cavity. The

¹ Read before Section on Otology, N. Y. Acad. Med., Nov. 10, 1904.

sinus clot was removed and a free flow of blood obtained from the upper end ; no flow, however, took place from the lower end. The mastoid wound was packed, and immediately afterward the operation for the resection of the jugular vein was performed. The boy made an uneventful recovery, with the exception of a slight opening behind the auricle which has been closed by a plastic operation. The tympanic cavity is dry.

Bacteriological Report.—Mixed infection in the mastoid cells ; staphylococci in the walls of the jugular vein.

CASE 2.—S. F., aged twenty-one, was admitted to my service in the New York Eye and Ear Infirmary, June 3, 1904. The history of the illness was briefly as follows: On March 4, 1904, he was seized with pain in the right ear, followed by rupture of the membrana tympani and discharge. Two days later he was admitted to the service of one of my confrères. March 11th, there was found tenderness on pressure over the mastoid tip, the membrana tympani swollen and congested but with fair-sized perforation. Drainage was further improved by enlarging the opening. The ice-coil was applied and irrigation used. On March 16th, the discharge was very profuse, and thick, and greenish in color, the membrana tympani markedly swollen and bulging, so a second paracentesis was made. March 18th, condition was better. March 20th, slight tenderness over tip. March 26th, condition unimproved, so a third paracentesis was made. March 29th, the mastoid process was explored. A cortical perforation leading down to an exposed sinus was found. The sinus was exposed from knee downward to the jugular bulb. The sinus was covered with granulations ; necrosis was very marked. The emissary vein was wounded.

The patient was discharged from the hospital on April 6th. Up to the third of June the patient had apparently been making a good recovery, but because of a return of the pain in the ear, and a temperature of 104° F., was readmitted to the hospital.

Physical examination showed the mastoid wound to be closed with the exception of a small sinus ; no dead bone was to be found on the exploration of this sinus. External auditory canal contained a small amount of purulent secretion ; no sagging of its walls. The membrana tympani was congested and bulging ; other organs normal. On June 4th, the temperature was 105 $\frac{1}{10}$ °

F., pulse 116, respiration 24. In Doctor Lewis's absence an exploratory operation was performed by Dr. John D. Richards. A little necrosed bone was found in the aditus ad antrum; the sinus was exposed and incised; the bleeding occurred from the upper end but none from below until the incision was extended well down toward the bulb and pressure made on the neck; this brought about a more free flow of blood. The patient's condition was such that it was thought best to desist from further operative interference. As the temperature remained high, he, 48 hours later, ligated and resected the internal jugular vein. The bacteriological report was: wall of vessel infected by streptococcus. On June 9th, a suspicious swollen and œdematous condition of the face, with a continuous high temperature, led us to transfer the patient to Bellevue Hospital for erysipelas. He remained there until June 22d when he was readmitted to our service. The wound in the neck had failed to unite primarily, but was clean and covered with healthy granulations. June 23d, a pneumonia was found to be present, and on the ninth of July an abscess was opened in the left gluteal region. He improved very slowly after this and was continually asking to be allowed to go home. On July 22d, 45 days after the ligation and the resection of the internal jugular, he left the hospital against my wish and advice. The wounds were all doing very well at this date, but the patient still had a daily rise of temperature to $99\frac{1}{2}^{\circ}$ F. The man was never seen again, but I heard that he very shortly went to Philadelphia, and that he died within the month.

CASE 3.—C. M. was admitted to my service in the New York Eye and Ear Infirmary, July 7, 1904. The patient, on admission, was in a semi-comatose condition, temperature 104.5° F., pulse 144, respiration 44.

The physical examination showed the tissues over the mastoid to be acutely sensitive to the touch and slightly œdematous; the upper posterior wall of the external auditory canal to be sagging; the membrana tympani to be almost destroyed; a slight amount of a thin secretion to be present. The patient was immediately prepared for an exploratory mastoidectomy. The surface of the mastoid process was found to be darkened; on opening the mastoid cells the bone was found to be very necrotic. The necrotic area involved the inner plate of the mastoid process, and the

sinus was exposed. It was found to be yellow in appearance and covered with a purulent exudate.

After the antrum had been curetted, the posterior wall removed, and the tympanic cavity curetted, the sinus was exposed from a point about an inch back of the knee downward to the jugular bulb. The sinus was incised and curetted; a free hemorrhage occurred from the torcular end but none from the jugular end of the sinus. The mastoid wound was packed, the neck laid bare, and the internal jugular vein was exposed from the subclavian vein to within a short distance of the jugular bulb, ligated, and resected. The vein was collapsed in its entirety, the walls thickened, and yellow in color. The patient was in collapse, notwithstanding hypodermatic stimulation of strychnine, etc., so an intravenous injection of a normal saline solution was given.

The septic thrombus extended into the subclavian vein to an indeterminable extent. He did not dare to proceed farther as the patient was in extremis. After the operation, the temperature gradually fell until at six o'clock the following morning it was $98\frac{1}{2}^{\circ}$ F., then it rose rapidly to $103\frac{1}{2}^{\circ}$ F. by ten o'clock, then to $104\frac{1}{2}^{\circ}$ F. by 4 P. M. The patient died at 4.15 P. M. in a cyanotic condition.

Bacteriological Examination.—Both inner and outer walls of sinus contain enormous numbers of mixed micro-organisms.

Particular interest in these cases lay in the involvement of the subclavian vein, and, as far as he was able to learn, they were considered by surgeons generally as practically inoperable.

THE RADICAL OPERATION IN CHRONIC MIDDLE-EAR SUPPURATION.¹

By DR. EDWARD BRADFORD DENCH, M.D., NEW YORK.

THOUGH much has been written within the last eight years in regard to the radical operation, it may not be out of place to report somewhat in detail my individual experience in regard to this procedure. That middle-ear suppuration is a disease of great importance, and one that demands radical treatment at the hands of the otologist, can be easily seen by the numerous statistics which have been compiled. In my own city of New York, and in the hospital in which I am interested, that is, the New York Eye and Ear Infirmary, during the eight years ending September 1, 1902, 19,323 cases of suppurative otitis media were treated. Of these cases, 14,487 were chronic and 4836 were acute. According to these statistics, 218 cases suffered from severe intracranial complications. It is impossible to determine from the statistics, in which cases the intracranial involvement followed an acute middle-ear suppuration and in which cases it followed a chronic middle-ear suppuration. We know, however, that intracranial lesions more frequently follow cases of chronic suppuration, and these statistics probably prove no exception to the rule. According to these statistics, one patient in every 88, who suffered from a purulent inflammation within the middle ear, also suffered from some severe intracranial lesion. These statistics alone, I think, demonstrate the importance of middle-ear suppuration, and are a sufficient excuse for any report of a series of

¹ Read before the International Otological Congress at Bordeaux, August 1-4, 1904.

cases operated upon for the relief of this condition. While the simpler procedure of removal of the ossicles and curettement of the tympanic cavity is all that is required to relieve cases of middle-ear suppuration in which the destruction of bone is limited to the ossicular chain, and to those parts of the tympanum easily reached through the meatus, the larger proportion of cases of middle-ear suppuration demand the radical operation.

Of the simple operation of ossiculectomy and curettement, I may say that out of ninety-two cases operated upon in this manner, fifty-three were cured, twenty-five improved, two were unimproved, and in twelve the result was unknown.

It is not necessary to detail here the various steps of the radical operation. In all of the cases reported, the complete radical operation was done; by that, I mean that the middle ear, mastoid cells, and external auditory canal were thrown into one large cavity. In no case, was the simple Stacke operation performed.

In order that a radical operation may be successful, four points must be borne in mind:

1st. The complete removal of the upper wall of the canal, so as to thoroughly expose the tympanic vault.

2d. The removal of the posterior wall of the canal avoiding the facial nerve, carrying out this step so completely as to entirely obliterate the posterior tympanic space—that is, that portion of the tympanic cavity which is hidden from view by the posterior wall of the external auditory meatus.

3d. The obliteration of the hypotympanic space, by removal of the inner extremity of the inferior wall of the canal, in order to expose freely that part of the middle ear which lies below the level of the lower wall of the bony meatus.

4th. A thorough curettage of the tympanic orifice of the Eustachian tube, to cause a complete closure of this channel, and to prevent reinfection of the tympanic cavity from this direction.

It is only by careful attention to these minute details that the operator can reasonably hope for success in the large majority of cases. While the radical operation, imperfectly

performed, probably guards the patient almost absolutely from any fatal consequence of middle-ear suppuration, a complete cure can only be promised where these four points mentioned above are continually borne in mind.

The period of convalescence is much shortened in these cases if, after the bony cavity is formed and a suitable plastic operation done upon the auricle for enlarging the meatus, the entire bony cavity is lined with skin grafts, according to the method of Ballance. In sixty-three of the cases reported the grafting method was followed. Of these, forty-three were grafted at the time of the first operation, and in twenty a secondary grafting was performed from five to ten days after the primary operation. In the other cases, the cavity was allowed to heal by cicatrization. Unfortunately, in the cases reported, the exact time of healing is not noted. The shortest time in which a cavity has healed, under skin grafting, has been three and a half weeks; the longest period, about four months. Where the wound was allowed to heal by cicatrization, the shortest period of healing has been about eight to ten weeks, and the average period much longer than this. There seems to be no difference in the ultimate results, whether the cavity is allowed to heal with or without the application of grafts; however, as grafting, either primarily or secondarily performed, shortens the time of cicatrization, it should always be used whenever this operation is employed. Whether a *primary* or *secondary* grafting shall be performed, may be a matter of choice. Personally, I have always inserted the grafts at the time of the first operation, except in those cases where hemorrhage was so free as to make it impossible to apply the grafts to the bony cavity, or in those cases where extensive exposure, either of the dura in the middle cranial fossa, or of the sinus, made it seem unwise to resort to grafting until these areas had been covered by healthy granulations. In some of these latter cases, a portion of the cavity was covered by a skin graft at the time of the primary operation, the exposed dura and sinus either being subsequently covered by a graft or being allowed to dermatize without grafting. These cases will be spoken of later.

The results in these operations have been extremely satisfactory: of ninety-eight cases operated upon, a complete cure resulted in seventy-one cases; in sixteen cases there was a slight discharge from the ear when the patient was last seen, several months after the operation. In five cases only could the operation be called a failure—that is, a profuse discharge remained after the operation. In two cases death followed the operation, one case dying of pneumonia and the other of meningitis; in neither case, however, could death be directly attributed to the operative procedure. In four cases the result of the operation was unknown, the patients having disappeared from observation.

It has been claimed that the operation is not justifiable in many cases, on account of the effect upon the hearing. Unfortunately my records are incomplete in regard to the hearing after operation in some of the cases operated upon. Of ninety-eight cases reported, hearing records have been preserved in sixty cases; of the seventy-one cases cured, the hearing was recorded after operation in forty-three.

It will be seen by consulting the tabulated report, that the hearing was excellent in a large proportion of cases; by this, I mean that the whispered voice could be heard six feet or over; this condition obtained in thirteen cases; in twelve cases, the hearing is noted as "improved," or "greatly improved" after operation. This note is made partly from the statement of the patient, and partly from tests. Of the cured cases, there is only one instance in which the hearing was made worse; in all the other cases, the test of the hearing showed a fair amount of audition for an ear which had been previously the seat of a suppurative process. In four cases, the hearing was unchanged after operation.

Of the cases in which a slight discharge remained, the hearing is recorded in twelve cases; in three cases it was seven feet, nine feet, and fifteen feet, respectively, for the whispered voice; in two of the cases the hearing, is recorded as "improved," and in the other cases the hearing, varied from one foot to five feet for the whispered voice.

In the five cases where the discharge remained "profuse," the hearing was made worse in one case, was unchanged in

one, and in the other three cases the whispered voice was heard at a distance of six feet or over.

So much for the general results of this series of cases reported. Certain observations made during the operation, and during the progress of healing, in these cases, may not be out of place.

One of the objections which has been made against the general adoption of the radical operation, is the danger to life. This, I think, is met by the series of ninety-eight cases in which in no instance could death be directly attributed to the operation. In the case of the patient where death occurred from meningitis, the child when taken to the operating room had a temperature of 101° , and it is quite possible that the meningitis was beginning before the operation. The second fatal case died of pneumonia, and the death, in this instance, could not be attributed directly to the operative procedure.

The mere exposure of the dura, either over the sinus or in the middle cranial fossa, constitutes, apparently, no menace to life. Where this exposure is extensive, it has been my practice to defer grafting over this area until the dura has been covered by healthy granulations; in other words, to do a secondary grafting in these cases. Where only a small area of the dura has been exposed, I have frequently grafted the entire cavity primarily.

In three cases a perforation in the dura was found; in two instances, this was due to a previous pathological process, and in the third instance, the dura was accidentally torn in removing a spicule of bone. Where the subdural space is invaded in this manner, it has always been my practice to pack off the site of the perforation by means of a strip of iodoform gauze, in order to prevent infection of the subdural space from the middle ear, and also to drain any products of inflammation which may have accumulated within the subdural space. In one case, the entire cavity, except that part immediately about the perforation in the dura, was grafted, and the posterior wound allowed to remain open for a week, at the end of which time it was closed. In the second case, where the dura was necrotic, the entire wound

was allowed to heal by granulation, and the posterior opening remaining, was subsequently closed by a plastic operation. In the third case, where the dura was accidentally torn, the dural area was isolated from the middle ear by means of a gauze packing, and the posterior wound sutured. This case was allowed to heal by granulation, no grafts being applied. In none of these three cases was there any rise in temperature, and all of the cases recovered without the development of a single unfavorable symptom. In one case, owing to the abnormally high position of the jugular bulb, this structure was wounded in exposing the hypotympanic space. The hemorrhage was controlled by a small pledget of iodoform gauze, placed directly over the wound in the bulb. The remainder of the cavity was then lined with skin grafts, which were held in place in the usual way, by means of cotton pledgets. A gauze packing was then carried between these pledgets and the pledget of gauze over the wound in the bulb, so as to isolate this as completely as possible from the grafts. The posterior wound was not closed in this case, until about ten days after the first operation; at the end of this time, removal of the gauze over the wound in the jugular bulb was followed by no hemorrhage, and a skin graft was placed over this area as well as over the lower portion of the tympanic cavity, and the entire posterior wound closed. Recovery in this case was absolutely uneventful.

Injury to the lateral sinus itself may occur in these cases, although, fortunately, it has not happened in the series reported. In two of the cases, the knee of the sinus lay very far forward, and it was necessary to enter the antrum through the external auditory canal instead of through the cortex in order to avoid the sinus. One of the cases was grafted secondarily, while in the other a primary graft was applied over that portion of the sinus which had been exposed. In this latter case, a rise of temperature occurred upon the third day, necessitating the opening of the wound and the removal of the grafts. The patient made an absolutely perfect recovery.

In a third case, the sigmoid portion of the sinus had been

previously exposed by caries, and in this instance only the upper portion of the cavity was grafted, the exposed sinus area being covered by a gauze packing which was brought out through the posterior wound. The upper three-fourths of the wound was closed by sutures. The gauze packing was removed on the sixth day, and the entire wound closed perfectly.

Another danger which has deterred many from advising this operation, is that of permanent facial paralysis. This accident has not occurred in any of the ninety-eight cases reported. In one case, the facial was injured at the time of the operation, and there was serious interference with the facial muscles for over one year after the operation. Complete restoration of function, however, took place ultimately in this instance. In perhaps 4 % of the cases, there was facial paralysis immediately after the operation, which yielded readily to treatment in the course of a few weeks. In perhaps 9 % of the cases, there was some slight interference with the function of the facial, coming on anywhere from two to six days after the operation. In every instance, this paralysis was but temporary, and cleared up in the course of a few weeks.

The occurrence of facial paralysis immediately after the operation naturally gives the operator more concern, as it seems to indicate injury to the facial at the time of the procedure. The careful operator always directs his anæsthetist to watch the face whenever he is using any instrument in the neighborhood of the facial nerve, and to report immediately if there is any twitching of the facial muscles. In my own experience, twitching of the face has been most frequently observed in curetting the upper and anterior portion of the tympanic cavity—that is, over that portion of the cavity where the *aquæductus Fallopii* crosses the middle ear. We know that dehiscences in the facial canal are not uncommon, even in health, and we frequently find that the wall of the Fallopian canal has been partially destroyed by disease. It is not unusual, therefore, to observe twitching of the facial muscles during the course of the operation. When this occurs, the operator should proceed with extreme caution, and should have the deeper

parts well illuminated, so as to be able to recognize the nerve trunk as soon as it is exposed. The mere fact that the facial nerve lies in the wound, should not prevent the operator from completing the operation. All carious bone must be removed, even although it is necessary to remove the entire external wall of the Fallopian canal.

The descending portion of the facial nerve is much better protected, and injury in this region seldom occurs.

While it is easy to explain the cause of facial paralysis coming on during the operation, it is rather difficult to explain the appearance of such paralysis several days after the operation. I am inclined to think that in some instances this late paralysis is due to the actual pressure of the pledgets which are used to hold the skin grafts in place, while in other instances it may be due to an infection of the nerve sheath from absorption of septic material from the pledgets. In other cases, the paralysis is probably caused by the tearing away of the *chorda tympani* branch. This branch of the nerve is almost always destroyed at the time of the operation, and it seems quite possible that when this is torn away from the nerve trunk a small hemorrhage may take place into the sheath of the nerve, sufficient to cause some interference with its function.

From the reported cases, it can be stated confidently that any interference with the facial nerve, coming on from twenty four hours to six or seven days after operation, may be utterly disregarded, as it will certainly disappear. Those cases which come on at the time of operation will disappear, unless the nerve trunk has been practically destroyed. From the fact that out of ninety-eight cases, there has been not one single case of permanent facial paralysis, it seems to the writer that this danger may be practically ignored in advising the operation, provided the operator uses extreme care in his manipulations.

In cases where the function of the facial has been interfered with, restoration of its function may be assisted by the internal administration of strychnine, and by the use either of galvanism or faradism, preferably the latter, to the facial muscles.

While the method of healing in the grafted cases usually presents no peculiarities in four instances healing took place in such an odd manner as to be worthy of mention. In these cases, at the time of the first dressing, on the fifth day, the entire middle-ear cavity seemed clean, and the grafts had apparently adhered in the usual manner. Subsequently, rather a profuse discharge took place from the ear, which was controlled by irrigation with a weak bichloride solution. Later, the entire middle ear seemed to fill up with a pretty firm granulation tissue, until this tissue reached the level of the plastic flap turned inward and upward from the concha to enlarge the meatus. The epithelium then spread from this region over the surface of the granulation tissue, the latter became slowly absorbed, and the entire middle-ear cavity remained lined with a firm layer of epidermis applied close to the surface of the bone.

In the earlier of these cases, the attempt was made to destroy this granulation tissue either with chemical caustics or by means of the curette. These measures apparently exerted no influence upon the process, and I was inclined to advise a secondary operation in at least two of these cases. Complete epidermization of the cavities took place, however, before this was decided upon, and in every instance the ears have remained perfectly dry, and the result of the operation has been exceedingly satisfactory. In two of the instances, the presence of this granulation tissue could be explained by the presence of a small area of necrotic bone which subsequently came away. In the other instances, however, there was absolutely no dead bone in the cavity. The healing in these cases was perfectly satisfactory, and the ears have remained absolutely dry since the time of operation.

Regarding the permanency of the cure in these cases, it is obvious that if all carious bone is removed the ear will remain perfectly dry. In some instances, however, where no carious bone remains in the middle ear, the patient will from time to time have a slight discharge; this may come on from a few weeks to many months after complete healing has taken place. Such a discharge is free from odor,

and, in my experience, is invariably an indication that the tegumentary lining of the middle ear is poorly nourished and fails to perform its function properly. A destruction of the superficial epithelium takes place, thus exposing the deeper layer of the skin. A certain amount of moisture is poured out from this layer, exactly the same as from an abraded area on the external surface of the body. If the condition is allowed to go untreated, the discharge dries, and the ear may become filled with a mass of desquamated epithelium, mixed with inspissated discharge. It is only necessary in these cases to remove the dried discharge, and sterilize the entire cavity with an alcoholic solution of bichloride of mercury of a strength of 1-3,000, and to dust into the cavity some bland powder, such as xeroform or boric acid. This procedure, if repeated a few times, will cause complete cicatrization. Occasionally this desquamated area is located over the mouth of the Eustachian tube, and in this situation it may require rather persistent treatment. If the discharge continues for a length of time, it is well to apply either the fused bead of nitrate of silver or chromic acid to the eroded surface.

RADICAL OPERATIONS (*Cured*).

HEARING.		
	<i>Whis. dist.</i>	<i>Acoumeter.</i>
2. Cured.....		Unknown.
3. "		"
4. "		"
5. "	o.	o.
6. "		Unknown.
7. "	15 ft. Much improved.	Watch, 4 in.
8. "		Unknown.
9. "	o.	Ac. o.
10. "		Unknown.
11. "		"
12. "		"
13. "		"
14. "		"
15. "		Fair.
16. "		Unknown.
17. "	1 ft.	Ac. 2 in.

RADICAL OPERATIONS (Cured).

		HEARING.	
		<i>Whis. dist.</i>	<i>Acoumeter.</i>
19.	Cured.....		Unknown.
20.	"		Fair.
21.	"	1 ft.	Ac. 3 ft.
22.	"	6 ft.	Watch, 6 in.
24.	"		Unknown.
25.	"	15 ft. Improved.	
31.	"	1 ft.	Watch, 3 ft.
32.	"		Unknown.
34.	"		"
35.	"		"
36.	"	9 ft.	Watch, 6 in.
37.	"	1 ft.	Watch, 3 in.
38.	"	1 ft.	
40.	"		Unknown.
41.	"	1 ft.	6 in.
43.	"	3 ft.	1 ft.
44.	"	5 ft.	
45.	"	12 ft.	
46.	"	1 ft.	6 in.
47.	"		Unknown.
49.	"		Unchanged.
52.	"		Unknown.
54.	"		"
55.	"		"
56.	"	2 ft. Improved.	
57.	"	10 ft.	
58.	"	2 ft. Improved.	2 in.
59.	"		Unimproved.
61.	"		Unchanged.
62.	"		Unknown.
63.	"		Improved.
64.	"		"
70.	"		Deaf-mute.
72.	"		Unchanged.
74.	"		Unknown.
76.	"	12 ft. Improved.	
78.	"	9 ft.	3 ft.
79.	"		Unknown.
81.	"	15 ft. Improved.	
82.	"	8 ft.	Watch, 0.
83.	"		Unchanged.
85.	"	18 ft.	5 ft.
86.	"	15 ft. Greatly improved.	Watch, 4 in.
87.	"	3 ft.	1 ft.

RADICAL OPERATIONS (*Cured*).

		HEARING.	
		<i>Whis. dist.</i>	<i>Acoumeter.</i>
88.	Cured.....	Unknown.	
89.	"	3 ft.	1 ft.
91.	"	0 Worse.	0.
92.	"	12 ft. Improved.	
93.	"	15 ft. Greatly improved.	
94.	"	Unknown.	
95.	"	12 in.	
96.	"	Unknown.	
97. ¹	"	4 ft.	2 ft.
99.	"	Improved.	
100.	"	6 ft. Improved.	Watch, 3 in.

RADICAL OPERATIONS (*Slight discharge*).

		HEARING.	
		<i>Whis. dist.</i>	<i>Acoumeter.</i>
1.	Slight discharge..	7 ft.	5 ft.
18.	" ..	Unknown.	
27.	" ..	"	
30.	" ..	"	
33.	" ..	9 ft.	2 ft.
50.	" ..	1 ft.	0.
51.	" ..	3 ft.	1 ft.
53.	" ..	0.	0.
60.	" ..	15 ft.	
66.	" ..	5 ft.	2 ft.
67.	Improved.	Improved.	
68.	Slight discharge..	Unknown.	
71.	" ..	4 ft.	1 ft.
73.	" ..	Unknown.	
77.	" ..	4 ft. Improved.	2 ft.
98.	" ..	4 ft.	2 ft.

RADICAL OPERATIONS (*Profuse discharge*).

		HEARING.	
		<i>Whis. dist.</i>	<i>Acoumeter.</i>
23.	Profuse discharge..	Worse.	
39.	" ..	Unchanged.	
42.	" ..	15 ft.	4 ft.
69.	" ..	8 ft.	2 ft.
80.	" ..	6 ft.	2 ft.

¹ Permanent opening.

RADICAL OPERATIONS (*Died or result unknown*).

HEARING.	
	<i>Whis. dist.</i> <i>Acoumeter.</i>
26. Unknown.....	Better after op.
48. " 	Unknown.
65. " 	"
75. Died (meningitis)..	"
90. Unknown.....	"
101. Died of pneumonia.	"

DOUBLE MASTOIDITIS, FOLLOWED BY DIPHTHERITIC EXUDATION WITH FATAL RESULT.

BY HENRY HORLBECK, M.D., COLUMBIA, S. C.

On February 13th, A. F., age four and one half, was referred to me by Dr. Taylor, with the following history:

Thirteen days previous, child was taken sick with measles, onset with convulsions and high fever, 104° F. to 105° F. Three days later, the characteristic rash appeared; case progressed favorably. On the morning of the 7th, the doctor was called for; the child had a bad night, complaining of pain in the left ear, high fever. On the 8th, the ear started to discharge; two days later, the right ear was discharging.

Upon examination on the morning of the 13th, the child was found well developed for its age. Skin was pale; tongue slightly coated. No involvement of the lungs. Rectal temperature 106° F.; pulse very weak, 120; respiration 20. A purulent discharge was found coming from the external meatus of both ears. After cleansing, inspection of the deeper structures showed a red and œdematous prolapse of the supero-posterior canal wall on both sides. There was absolutely no tumefaction behind the auricle. It was impossible to elicit tenderness on pressure over the mastoids as the child was so fretful and irritable.

The temperature was taken every three hours, continuing high, being 105° F. at 7 P.M. Examination of the fundus oculi was negative. A slight diminution in the amount of discharge had been noticed for the past few days.

On the morning of the 14th, the general condition somewhat improved, temperature 104° F., pulse stronger. A very slight fulness was noticed at the tip of the left apophysis. The seri-

ous condition of the child was explained and immediate opening of the mastoid advised.

Operation.—Chloroform was administered, the usual curvilinear incision made through the soft parts to the bone, the tissues retracted, exposing the mastoid cortex which was slightly darkened. The periosteum was easily detachable. The cortex, which was somewhat soft, was removed, exposing the cellular mastoid spaces, all of which were filled with pus. The intercellular bone was dark, soft, and necrotic. Softened bone was found everywhere. The entire process was removed. On opening the antrum, a small amount of pus was found. The antrum was cleansed of pus and granulation tissue, and a free communication with the middle ear was established through the aditus. A similar condition was present in both processes, with the exception of a small Bezold perforation on the left side.

The following day the temperature ranged between 102.5° F. to 103° F.; pulse weak, 130; respiration 26. At 6 P.M. the dressings were removed; both wounds were rather clean. On the left side both bone and soft tissues had a dead-white appearance. The right side presented a similar picture, to a less degree, the upper portion of the wound alone being affected. Both wounds were thoroughly explored with a probe, but no fistula was found. It was irrigated with 1 to 5000 bichloride solution and lightly packed with iodoform gauze.

The next day, the 16th, condition somewhat improved; temperature varied from 99.6° F. to 103.4° F.; pulse 108, respiration 20.

The 17th.—Temperature 99.4° F. to 101° F.; pulse 108, respiration 20. Both wounds found covered with a dense pseudo-membrane, which was firm and closely adherent to the underlying tissues. The membrane was dirty greenish. The appearance of the wound suggested a diphtheritic condition. Examination of the throat revealed a simple catarrhal angina with no membranous deposit. A portion of the membrane was removed and sent to Dr. Coward for bacteriological examination. The wound was cleansed with hydrogen dioxide. Patient had a restless night.

The 18th.—The child's condition seemed to have improved, and she was more bright and cheerful. Temperature ranged between 101° and 100° F. At 5 P.M. temperature started to rise, reaching 105.6° F. at 8 P.M.; pulse 140, respiration 26. The

condition in the wound had gradually progressed, assuming a necrotic appearance. An application of pure carbolic acid was made, followed by alcohol to neutralize its effect. This sudden rise in temperature was not preceded by a chill or chilly sensations. Examination of the eye-ground proved negative. The temperature gradually subsided, being 100.6° F. at midnight.

The 19th.—The temperature remained the same until 12 o'clock on the 19th, when it began to rise, reaching 103.4° F. at 6 P.M. The necrotic process in the wound had advanced and the parts presented a gangrenous appearance. At 8 P.M. a consultation was held and it was decided to administer 3000 units of anti-diphtheritic serum. By midnight the temperature was 105° F., P. 144, R. 28.

2 A.M., T. 107.6° F., P. 160, R. 30.

5 A.M., T. 107° F., P. 152, R. 34.

8 A.M., T. 106° F., P. 160, R. 32.

The temperature was gradually reduced by alcohol sponges, cold enemas, and phenacetine. The temperature had gradually subsided, being 101.4° F., pulse 135. At 11 P.M. it had risen to 104.4° F. From then on, the child gradually grew worse until the morning of the 22d, when she died.

The 20th.—The next day the antitoxine was not repeated. Whether the condition was aggravated by its use, I am unprepared to say. Authentic cases are on record in which its use has been far from satisfactory in genuine cases of diphtheria.

I felt almost confident that we had to deal with a thrombosis of the sigmoid sinus. Had it not been for the extremely critical condition of the child and the diphtheritic process in the wound, I would have exposed the sinus without hesitation. Under the circumstances, it was thought best not to interfere. The result of the bacteriological examination had demonstrated the presence of the Klebs-Loeffler bacillus.

Pseudo-membranous inflammation is not uncommon on ulcerated surfaces and wounds. In the majority of cases it is a streptococcus infection. But when the patient is suffering with diphtheria the Klebs-Loeffler bacillus is usually found.

As stated before, the throat showed nothing more than a

simple catarrhal angina of a mild type, without the presence of a membrane; it is true that the Klebs-Loeffler bacillus has been found in cases of non-membranous angina. During epidemics this organism may be met with in healthy throats, particularly in persons brought in contact with the disease and in the same house.

According to Welch, the term "wound diphtheria" should be limited to infection of a wound by the Klebs-Loeffler bacillus. This may manifest itself as a simple inflammation, or inflammation with superficial necrosis, or inflammation with more or less adherent pseudo-membrane. "Wound-diphtheria" may occur without demonstrable connection with cases of diphtheria and without affection of the throat in the individual attacked, but such cases are rare (Osler).

I deeply regret the fact that a culture was not taken from the throat, notwithstanding the benign appearance it presented.

Had this step been taken, and the Klebs-Loeffler bacillus found, it would have been a simple matter to account for the condition which was present in the wound. On the other hand, had the report been negative, we would have been certain that we were dealing with a genuine case of "wound diphtheria."

ON THE STATISTICS OF OTITIC DISEASES OF THE BRAIN, MENINGES, AND CEREBRAL SINUSES.

By DR. TAKABATAKE,

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[FROM THE UNIVERSITY EAR CLINIC, ROSTOCK.]

Translated by Dr. ARNOLD KNAPP, from *Zeitschr. f. Augenheilk.*, Vol. XLV.,
No 2.

OUR knowledge regarding the relative frequency of the various intracranial complications of aural and temporal bone suppurations is still imperfect.

Up to the end of the '80's of the previous century, this question could only be solved by the statistics of autopsies, as the differential diagnosis between sinus phlebitis, brain abscess, and meningitis was not developed, and reports of operations had not been given. The statistics of autopsies, moreover, were unable to give us definite information on many points which are of importance to us to-day. The autopsy was unable to show definitely whether the brain abscess had perforated into the ventricles or into the meninges, or whether the meninges had become secondarily affected from a diseased sinus. Moreover, it was difficult to determine which of the various suppurations in the skull occurred first and produced the others, or whether they appeared independently of the primary purulent focus in the temporal bone. The statistics did not give us any information on the most frequent otitic intracranial complications, viz., external pachymeningitis and extradural abscess, be-

cause these generally did not lead to death directly, but first induced fatal suppurations in the brain, meninges, or sinuses. The importance of these suppurations as transmitters of infection was not recognized until 1888, on the appearance of the paper of E. Hoffmann.

The operative era, which began at the end of the '80's, has aided considerably in making statistics on the relative frequency of the various complications, but the conditions are not as yet sufficiently clear. The operative cases reported in literature were collected for this purpose. This material, however, was defective and could not be well used, as all forms of inflammation could not be cured by operation, and of those which were curable one and then the other type would be most prominent in interest, and finally, because favorable cases were more frequently reported than those which failed notwithstanding operation. It is possible to obtain an unbroken series of observations only when the individual operators or hospitals publish their entire material.

When Professor Koerner began to publish all of the cases of this character occurring in his clinic in continuous series, he had the hope in view of furnishing suitable material for statistics. The cases which were not explained by operation or autopsy were excluded. Fifty-four cases could be made use of.

Of these fifty-four, thirty-four were uncomplicated, if we disregard the slight changes in the external surface of the sigmoid sinus in perisinuous abscess. Twenty of the fifty-four cases were complicated.

TABLE I.

I. UNCOMPLICATED CASES.

1. Perisinuous abscess:	
(a) with external changes in the sinus.....	13
(b) without external changes in the sinus.....	2
2. Extradural abscess in the middle cranial fossa.....	7
3. Sinus phlebitis.....	7
4. Purulent leptomenigitis.....	4
5. Cerebellar abscess.....	1

2. COMPLICATED CASES.

Perisinuous abscess:

(a) with sinus phlebitis.....	6
(b) with sinus phlebitis and leptomeningitis.....	I
(c) with sinus phlebitis (transverse and superior petrosal) and leptomeningitis.....	I
(d) with empyema of the saccus endolymphaticus.....	I
(e) with empyema of the saccus endolymphaticus and leptomeningitis.....	I
(f) with obliteration of the transverse sinus, cerebellar abscess, and leptomeningitis.....	I
(g) with extradural abscess in the middle cranial fossa..	I
Puriform extradural cholesteatoma in the middle and posterior cranial fossæ.....	I
Extradural abscess in the middle cranial fossa, perisinuous abscess, and sinus phlebitis.....	I
Extradural abscess in the middle cranial fossa, subdural abscess, and leptomeningitis.....	I
Extradural abscess in the middle and posterior cranial fossæ, intrameningeal abscess on the temporal lobe, and complete obliteration of the transverse sinus.....	I
Deep-seated extradural abscess in the posterior cranial fossa.....	I
(a) with leptomeningitis.....	I
(b) with cerebral abscess.....	I
Abscess of the temporal lobe with progressive encephalitis..	I
Sinus phlebitis and leptomeningitis.....	I

Of the uncomplicated cases, the extradural abscesses are the most frequent, and of these the perisinuous ones are twice as frequent (fifteen to seven) as those in the middle fossa. The great frequency of slight external changes (granulations, discolorations) of the sinus in perisinuous abscesses is noticeable—changes which, after the evacuation of the perisinuous abscess, are without significance. All of these cases recovered.

In the following table the cases are not recorded, but all of the intracranial types of inflammation are enumerated which were observed in these cases. The table also shows the relative frequency of the external and deep-seated

extradural abscesses. There are four additional cases which could not be included in Table I.

TABLE II.

NUMBER OF OBSERVED VARIETIES OF INTRACRANIAL COMPLICATIONS.

Perisinuous abscess.....	31
Deep-seated extradural abscess in the posterior cranial fossa.	2
Empyema of the saccus endolymphaticus.....	2
Extradural abscess in the middle cranial fossa.....	12
Extradural abscess at the tip of the petrous pyramid.....	1
Sinus phlebitis :	
(a) transverse sinus.....	18
(b) transverse sinus and internal jugular.....	4
(c) transverse sinus and superior petrosal sinus.....	1
(d) symptom-complex of phlebitis of the cavernous sinus (recovery after operation for suppuration of the temporal bone)	1
(e) otitic pyæmia with joint metastasis without definite sinus phlebitis.....	1
(f) pyæmic fever after acute otitis media without mastoiditis and without definite sinus phlebitis.....	1
(g) obliteration of the transverse sinus through previous phlebitis.....	1
(h) pulmonary embolus after injury to the mastoid emissary vein (recovery).....	1
Subdural suppuration.....	2
Purulent leptomeningitis.....	11
Abscess in the temporal lobe.....	2
Abscess in the cerebellum.....	2
Progressive encephalitis with abscess in the temporal lobe..	1

The absence of meningitis serosa and the relative infrequency of brain abscess (two in the temporal lobe and two in the cerebellum) are the most striking features of this table.

As to the primary suppuration in the ear, we have to differentiate between acute and chronic suppurations. It is not so long ago when it was believed that only chronic suppurations led to intracranial complications. Even v.

Bergmann regarded the chronicity of an aural suppuration as a deciding factor in the diagnosis of brain abscess. Observations from the operative era have shown that this is untrue. In our fifty-four cases the primary disease was acute in thirty, chronic in twenty, of unknown duration in four. In other words, the old rule is practically reversed.

The theory that the chronicity of the suppuration was the important factor belongs to the time in which the external pachymeningitis and the extradural abscess were not clinically recognized, and their importance as transmitters of suppurations from the temporal bone to within the cranial cavity not appreciated. It always took some time before the symptoms of the meningitis, of the brain abscess, or of the sinus-phlebitic pyæmia set in, because suppurations in the ear and the temporal bone were not attacked sufficiently early by operation. At the present day every suppuration in the temporal bone is operated upon as early as possible, and we frequently find extradural abscesses which have caused absolutely no symptoms. In other cases we are able to discover complications like perisinuous suppurations, by their symptoms, at an early date. In our uncomplicated extradural abscesses, the primary disease was acute in eighteen cases, chronic in two, unknown in two.

The removal of the primary disease and of the extradural abscess in the acute stage has prevented the onset of brain abscesses, meningitis, and sinus phlebitis in the chronic stage. Our statistics also show a striking scarcity of brain abscesses. This will be explained if we study the cases of brain abscess which have been published in the 60's and 70's of the last century. We find the primary disease very frequently has reached a stage which we to-day only occasionally see coming from the most remote parts of the country where no suitable medical aid is obtainable—as, for instance, in cases with fistulæ in the mastoid processes which have existed for years.

ON ADENOID CACHEXIA.

I.—EXAMINATION OF THE BLOOD IN CHILDREN BEFORE
AND AFTER THE REMOVAL OF ADENOID VEGETATIONS.

II.—DOES CYCLIC ALBUMINURIA FREQUENTLY OCCUR IN
CHILDREN WITH ADENOID VEGETATIONS?

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[FROM THE UNIVERSITY EAR CLINIC IN ROSTOCK, GERMANY.]

Translated by Dr. ARNOLD KNAPP, from the *Zeitschrift f. Ohrenhkl.*, XLIV.,
No. 4.

I.

KOERNER suggested in 1895 that the unfavorable influence of an enlarged pharyngeal tonsil was not only exerted on the entire constitution of the child but probably affected the constituents of the blood. In 1900 Lichtwitz and Sabrazes¹ investigated this point.

According to these authors, not only does the general condition of the patient become much improved after the removal of the adenoids, but there is a decided improvement in the constituents of the blood; they always found that the quantity of hæmoglobin was increased, and that the number of red blood cells was increased while the number of white blood corpuscles was diminished. These examinations of the blood and body-weight were not done at a definite interval after operation, but in some cases took

¹ *Archiv für Laryngologie u. Rhinologie*, vol. iii., p. 233.

place on the 11th, 14th, and 15th days, and in others not until the 55th or the 122d day after.

It seemed, therefore, desirable to undertake a larger series of examinations, and to make the second blood examination on a definite date after the operation. I selected the 28th day after the operation for this purpose.

In the 12 cases examined, the quantity of hæmoglobin was increased after removal of the adenoids, the red blood corpuscles were increased in number in only 8 cases. In the other 4 a diminution occurred. The number of white blood corpuscles in all cases diminished after operation. All types of leucocytes were not decreased in the same proportion. The polynuclear and the eosinophile cells were slightly increased, while the large mononuclear cells and the lymphocytes were diminished, but their diminution was greater than the increase of the first named, and a general diminution of the white blood corpuscles resulted. The increase of the hæmoglobin and of the red blood corpuscles, together with the diminution of the white blood corpuscles, indicate an improved condition of the blood, especially as an approach to the normal condition took place. The general condition improved, the body-weight increased except in one case where it remained stationary.

II.

According to certain authorities, the so-called cyclic albuminuria occurs in those children and youthful individuals of feeble constitution and retarded development. Cyclic albuminuria means a form of excretion of albumen in the urine characterized by the absence of anatomical changes in the kidney in otherwise healthy individuals, and occurs principally when the patients have been up, consequently chiefly during the day, and disappears on rest in bed as at night.

Gress in a dissertation (Rostock, 1902) stated that this form of albuminuria was found in feeble individuals more frequently in proportion with increase of other symptoms of feeble health. The other symptoms were chlorosis, scrofula, and dilated heart.

As children with adenoid vegetations are usually feeble, I examined the urine of 50 such children to determine whether cyclic albuminuria occurs in them. Thirty-nine of the children were between five and fifteen years of age, and 11 were below five years; 28 were male and 22 female.

The urine was examined for albumen with Heller's test, boiling, as well as with ferrocyanide acetic acid. The urine was generally examined a short time before the operation in the middle of the day.

In the 50 cases, albumen was found present in only one, which, however, did not again occur after rest or after moving about. The period of observation was only four days. We have thought that this albuminuria must be regarded as cyclical, though it is possible that an alimentary albuminuria might have been present.

Gress found 86 cases of cyclical albuminuria in 304 feeble children, while the percentage is very much smaller in well developed children and in adults.

Our one positive case in 50 children with adenoid vegetations shows such a slight percentage that the occurrence of cyclic albuminuria in children with adenoid vegetations may be regarded as purely accidental.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

MEETING, NOVEMBER 22, 1904. DR. J. B. EMERSON, THE
PRESIDENT, IN THE CHAIR.

BY DR. ARNOLD KNAPP, SECRETARY.

Presentation of Cases.

Dr. BERENS presented two patients upon whom he had performed a **radical operation** and made use of a **skin-grafting procedure**, which he had described to the Society at a meeting about two years ago. The peculiarity of this procedure was the formation of a comma-shaped flap from the skin back of the mastoid incision, and inserting this flap into the middle ear, leaving an attachment at the upper extremity.

In the first patient the radical operation was performed six weeks ago, on account of an acute exacerbation of the O.M.P.C. Two weeks after this, the plastic operation was performed. The ear is now dry in the depth, though not healed externally in the antrum.

The second patient was a girl with chronic otorrhœa, upon whom a Stacke operation, with the author's plastic procedure, had been performed nine days ago. This case was progressing so rapidly that it probably would be healed in two weeks.

The two cases show the results of this procedure in both primary and secondary operations.

Discussion.—Dr. ARNOLD KNAPP, while complimenting the speaker on his results in these two cases, thought that there were two objections: (1) that the flap was too thick, so that when in position in the tympanum that cavity loses its normal outlines and becomes very small; (2) the objection which is common to

all methods of covering the tympanic walls and mouth of the Eustachian tube by flaps or skin-grafts, that in all severe cases—that is, cases which are difficult to heal—the disease is most frequently situated in the tympanum, and consequently the flap or skin-graft cannot be employed. If the tympanum is healthy, the healing takes place rapidly without any aid of skin-grafts.

Dr. BERENS replied that in his experience the flap placed in the tympanum became thinner, and eventually resembled a skin-graft, except that the ear never presented that scaly condition which is so unpleasant after skin-grafts.

Dr. GRUENING asked whether Dr. Berens had encountered any unfavorable results. He thought it no more than right, in judging of a method, that information should also be furnished of the ill successes.

Dr. BERENS replied that he had unquestionably had a great deal of bad luck with this method, and that in some cases the flap had sloughed, and in one erysipelas had occurred. On the whole, he had used this method for about four years and had met with a great deal of discouragement in the early cases, but had had much better results recently. He does not think that the time is ripe for any definite judgment of this method.

Voluntary Contributions.

Dr. DUEL reported on a case of **O.M.P.C. and epidural abscess**. The patient, a young lady, had consulted him recently on account of pain in the ear for three nights. She had suffered for fifteen years from occasional otorrhoea after measles. He found a swelling behind the ear, and a large gland beneath the ear. It was quite difficult to determine whether the symptoms were entirely due to a diffuse otitis, which was present, or whether there was also mastoiditis. He finally decided that the latter condition was present and advised an operation. At the operation the whole of the mastoid process was found sclerosed except a cell at the tip which contained pus. The middle ear and mastoid antrum were filled with pus and granulation tissue. There was no necrosis of the tympanic walls or of the ossicles. The tegmen antri was necrotic, and above it was a mass of granulations and pus, forming an epidural abscess of considerable size.

Dr. BACON was reminded of a case of chronic mastoiditis in a truck driver which he had seen last year, where similar conditions obtained, viz., an epidural abscess with very few

symptoms. The man was at work until three hours before the operation.

Dr. MCKERNON inquired as to the condition of the canal.

Dr. DUEL: It was stenosed.

Dr. PHILLIPS thought pain in the mastoid in chronic cases very important and significant as a guide for operation.

Dr. GRUENING reported on a case of **severe sinus phlebitis without symptoms** occurring in a woman forty-five years of age, who had suffered from severe pain in the ear with discharge. Paracentesis had been performed a number of times, and an operation was advised. This was refused by the patient, and she subsequently came under his care. He found a bulging drum, small perforation, mastoid tender. After paracentesis was made she improved. The patient had suffered from puerperal mania and had "acted queer," according to the husband, for many years, and suffered from diabetes. Dr. Gruening then lost sight of her for a certain length of time until she happened to be admitted to the Mt. Sinai Hospital. There were no symptoms except pain at night and insomnia. She was carefully observed for one week. The drum was closed and hearing somewhat diminished, but she seemed otherwise perfectly well. She was about to go home when she was taken with vomiting and vertigo. Temperature rose to 104° F. An operation was performed as soon as possible and a perisinuous abscess was detected. The sinus was hard. On opening, the clot was removed. It was perfectly solid except below, where fluid was encountered, then pus, a white clot followed by a red clot, and finally a gush of blood. Bleeding was easily restored from the upper extremity. On the following day, vomiting continued with high fever. The jugular was exposed. Following it up in the neck, a clot was found extending from the junction with the facial vein upwards. This part was excised and the vein irrigated. The patient was in a very poor condition, and, notwithstanding every attempt at resuscitation by infusion and so forth, the pulse remained high and she died in two days. Death was indirectly due to her diabetes. The eyes were always normal.

The case is of interest as showing the possibility of a severe sinus lesion with practically no symptoms in a patient who was under observation, and where the operation was performed too late.

Dr. W. SOHIER BRYANT had recently observed a patient at the

Presbyterian Hospital, suffering with severe unilateral headache and a slight rise of temperature. Tenderness behind base of mastoid, normal hearing and drum membrane. Sleeplessness. On account of the severe headache and insomnia he recommended an operation. This was performed at the Presbyterian Hospital, and an epidural abscess was found at the tender point, with considerable erosion of bone.

Dr. BACON thought that diabetes was unquestionably frequently a serious complication. He had also had experience in operating on cases which did not rally after operation.

Dr. GRUENING did not think that diabetes was always such an unfavorable factor. He remembered a patient where after an otitis pain continued. On admission, a double mastoiditis was found in a patient with 6 % of sugar. Operations were performed on both mastoids, and the patient, though sixty-five years of age, made a good recovery. Another patient, seventy years of age, with double mastoiditis, did not recover consciousness after operation.

Dr. MCKERNON spoke of a case of mastoiditis occurring in a patient, fifty-four years of age, with diabetes. The patient looked extremely septic. He, however, did perfectly well after operation, except that the wound healed rather slowly.

Two years ago he operated upon a case of recurring mastoiditis, in which the urine contained hyaline casts. The patient was fifty-one years of age. After operation, two stitches at the upper end of the wound appeared to melt out. Sugar was found in the urine. The wound did not heal in a year. The patient then went insane. The amount of sugar increased to 12 %, and he died in coma.

Dr. GRUENING spoke of a case of **double mastoiditis** in a poorly developed child, thirteen months of age, presenting an infiltration behind one ear and a bilateral discharge. At operation, he found no pus under the periosteum, but the soft parts were very much infiltrated and the squamo-mastoidal fissure was unusually patent. The bone was so soft that it could be curetted with a spoon. In the other ear, an enlarged gland was present, with copious discharge at operation. The squamo-mastoidal suture was found closed. It was necessary to use the chisel as the bone was quite hard, and in this case the disease was very much more serious. The sinus was bare but healthy.

He is very much impressed by the frequent occurrence of

binaural affections, and also by the fact that the internal changes were found to be greatest where the external symptoms were least marked.

Dr. TOEPLITZ spoke of a bilateral mastoiditis in a child thirteen months of age, where, on one side, the mastoid was found disintegrated; on the other, a large gland, mastoiditis, and a cervical abscess.

Dr. BACON believed that bilateral mastoiditis was very much more frequent in the last year than formerly. He had observed three cases in private practice at the same time. He thought that this last year had been an unusual one for the number of mastoid cases.

Dr. PHILLIPS was entirely of Dr. Bacon's opinion, and remembered that he had seen a double mastoiditis in a child of seven months.

Dr. BERENS asked whether, in this last case, the mastoid process was found developed.

Dr. PHILLIPS thought that there was apparently a tip cell present in addition to the antrum.

Dr. DUEL stated that it was his experience in young children to find, usually, a much larger cavity than the antrum could furnish. He thought this must be due to the presence of cells, and that the statement found in the books in regard to the age at which the diploetic tissue began to develop was wrong. He thought that we were often astonished at the size of the excavation necessary for the removal of all the diseased tissue in the mastoid processes of children.

Dr. BERENS remembered that in a child five months of age he had found nothing more than the antrum, aditus, and tympanum present.

Dr. GRUENING thought that there was generally only one cell present; that the bone at the apex was thick, but that there was no tip cell.

Dr. HARRIS reported upon the case of a boy seven years of age, who, after a cold in his head, suffered from earache. The drums were slightly altered and there was some fever. Hot douching and internal treatment were without avail, and after forty-eight hours the drum was opened. Pus was evacuated immediately in one ear and appeared after twelve hours in the other. Examination revealed a diplococcus extracellularis.

In the sister of this patient, the same symptoms set in with a

temperature of 101° F. The same treatment was carried out for twenty-four hours. Paracentesis revealed pus containing the same diplococcus.

He thought the case was of interest as showing the relation of the micro-organism found present with the fact that, with so few objective symptoms, pus was found on paracentesis.

Dr. GRUENING again spoke of the experience they had had at the Mt. Sinai Hospital, that most of the smears showing the pneumococcus-like organisms subsequently developed into streptococcus, so that they did not have the same proportion of pneumococcus infections as in other hospitals.

Dr. DENCH thought that the question of the bacteriological examination was of scientific interest but of less practical importance.

Dr. KIPP asked why paracentesis had been performed.

Dr. HARRIS replied, on account of a slight bulging, a slight amount of pain, and the fever. He regarded it, more or less, as an exploratory operation.

Dr. DENCH thought that the temperature was a sufficient indication for paracentesis.

Dr. GRUENING spoke of a child, two years of age, with high fever. The ears were red, one more than the other. He was called in to determine whether the high fever could have been produced by the otitis. The physician in charge claimed that there was no other possible explanation for the high fever. Under these circumstances the ear drums were punctured. No pus was found, but the bleeding was profuse. On the following day pneumonia developed.

Dr. HERMAN KNAPP spoke of the case of a child, one year of age, with otorrhœa, in which he had opened the mastoid and antrum, and exposed the sinus. This was followed by pyæmic temperature for ten days. The wound was clean, and the case subsequently healed. He thought this was not uncommon in children.

Dr. KIPP had operated upon a child one year of age. The operation was followed by high fever for several days which then rapidly fell.

Dr. DENCH thought that the high fever was quite frequent and was to be explained because we generally have a postaural abscess present and when this is opened considerable purulent material is absorbed.

Dr. GRUENING was also of this opinion, but thought it strange that the high fever did not occur in chronic cases or in cases of caries, but only when an empyema of the antrum was present under pressure. He thought that a toxic absorption takes place by spreading of the pus from careless sponging. He was inclined, after having made a small opening, to wipe away the pus as it appears with fresh sponges.

Dr. KIPP stated that he followed the same steps but, nevertheless, encountered high fever.

Dr. W. SOHIER BRYANT asked whether the increased febrile reaction in children could not be accounted for by the increased permeability of the lymphatics whereby infection travels more freely.

Dr. BACON thought that this condition of hyperpyrexia occurred more frequently in hospital cases than in private cases.

Dr. DENCH thought that thorough sterilization of the field of operation before operation was of importance in influencing post-operative fever.

Dr. HARRIS, some time ago, had examined the post-operative temperatures at the Manhattan Eye and Ear Hospital after mastoid operations, and had found that there was an almost universal rise for twenty-four hours, but that the temperature became normal after forty-eight hours. This he found occurred both in adults and children.

Dr. TOEPLITZ related some recent experiences with **legal cases.**

In the first, a man of sixty-four fell from a street car and became unconscious. One year later he was deaf, and it was impossible to determine the connection between the loss of hearing and the injury. The patient, nevertheless, received damages.

In the other case, a man fell from a car, striking an elevated railroad pillar, and remained unconscious. On the following morning, with bleeding ear and in a stupor, he was taken from the hospital to his home in Astoria. Two weeks later he complained of vertigo, which persisted for five weeks. During an attack of typhoid fever which then set in the vertigo ceased, but recurred later and is now present. Though Dr. Toeplitz's testimony, that the man's hearing was probably affected from the accident, was not accepted, damages were nevertheless given.

Dr. ADAMS stated that he had to examine a great number of persons suffering from deafness for pension claims, and he had

found it impossible to prove the deafness in some of the cases. He reported upon an operation where he had found the sinus perfectly sealed off, presenting one solid mass with the dura. By good fortune he happened to strike the central part of the sinus with his knife. It was a case of Bezold's mastoiditis.

Dr. DENCH had had a similar experience in one case.

Dr. PHILLIPS spoke of a woman, sixty years of age, with chronic purulent otitis, the special symptom being a most distressing tinnitus. All treatment was of no avail, and he suggested a Stacke operation, which was performed about four weeks ago. Granulations were found in the tympanum and antrum; the ossicles, however, were healthy. He was enabled to complete the operation in fifty minutes. The healing has been rapid. It is not, however, quite dry. The tinnitus has been relieved to a great extent, and in the opinion of the patient is about half as loud as formerly. She is fully satisfied with the result.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

STATED MEETING NOVEMBER 10, 1904, THE PRESIDENT, DR. HERMAN KNAPP, IN THE CHAIR.

Presentation of Cases.

Dr. R. LEWIS presented two cases of **temporo-sphenoidal abscess**. Operation. Recovery. (Published on pages 7-10 of this issue).

Dr. FRANKLIN M. STEPHENS presented a patient who had suffered from **acute temporo-sphenoidal abscess** with streptococcus infection. Operation. Recovery. (Published in full on pages 1-6 of this issue).

Discussion.—Dr. DUANE. Two years after the operation, Dr. Stephens's patient came to me complaining of failing vision at night and whenever the light was poor. The movements of the eyes were normal except the slight deficiency in converging. The pupils were also normal. My records of the finding of the fundus have been mislaid, but my recollection is quite clear that there was no evidence left of previous optic neuritis, and no evidence of any consecutive atrophy. The interesting finding in connection with the eye was the visual field. There was, as shown in this rough diagram, an almost complete absence of the outer-lower quadrant in each field, as well as a slight general concentric contraction. In spite of the symmetry of the defect, I regard the symmetry as purely accidental, *i. e.*, the defects in the fields are due to destructive changes that chanced to lie symmetrically in the two optic nerves, and are not, as might be supposed, due to a single lesion in or about the chiasm. There was nothing to indicate the existence of such a lesion.

Dr. KENEFICK regretted that he had not arrived in time to hear the early part of the paper, and wished to know if the usual symptom of aphasia was present.

Dr. STEPHENS replied that he had stated that none of these symptoms were present. The abscess was located on the right side.

Dr. BRANDEGEE said that he would like to endorse Dr. Stephens's remark about the Whiting encephaloscope. It had been more than useful to him in two instances. It is easily introduced into the brain without injury to the tissue, and enables one to make a thorough examination of the surrounding walls. He did not believe in packing iodoform gauze into a brain abscess unless the walls of the cavity were firm. It is a pretty strong dressing for a brain abscess. With the Whiting encephaloscope a good view of the side walls of the cavity could be obtained and the wound could be carefully dressed, and the results were more than good. The question of dressing the wound might be thoroughly discussed, for there is great diversity in practice—some using plain dressing, some iodoform gauze, some packing the wound tightly, some loosely. Both of the gentlemen who had spoken should be congratulated upon the excellent results they had obtained. In his own practice and at the New York Eye and Ear Infirmary, when they had a brain abscess with loose walls they pack it with a single width of plain gauze, and when the walls were firm they pack it firmly. No satisfactory idea of the condition of the cavity could be obtained with the finger, but with Dr. Whiting's instrument it could be examined carefully, an accurate idea of its condition and character obtained, and it could be dressed accordingly.

Dr. EAGLETON, referring to Dr. Lewis's first case, said that he had had a similar one. The patient had a fainting fit, otorrhœa, was unconscious for half an hour, and then regained consciousness. While recovering from the mastoid wound, the patient lost flesh rapidly, and we discovered that he could not call anything by name. He could tell the use of an object but could not name it. I thought the case warranted opening of the head and decided to operate. Dr. Mills claims that there is a naming centre and places it in the temporo-sphenoidal convolutions. I opened above the auditory space and explored in six directions, but found nothing. The wound was closed, and the man recovered from the ether excellently and for six days was apparently well. It was then dis-

covered that he had a hemianopsia. This was only roughly tested, but on holding up a paper before him he could see only half of a name written on it. There was undoubtedly an abscess there although we had failed to find it. It may have been behind towards the occipital lobe. That night the man had a chill, and hemorrhage from the wound. The whole of the wound was torn out and the brain structure came out. The man went into a coma and died a few hours after. No autopsy was held, but pus, as well as blood and brain tissue, came from the wound. There is no doubt in my mind that there was an abscess, though we failed to find it.

Dr. LEWIS said that in regard to dressings he generally used sterile gauze and always packed the wound loosely.

The CHAIRMAN said that in Dr. Lewis's case, where hemianopsia was a focal symptom of brain abscess, its seat was not likely in the occipital lobe but at the optic radiation through the temporal lobe where the greater number of brain abscesses were located. They are very rare in the occipital lobe.

Dr. LEWIS reported three cases of **lateral sinus thrombosis**, one of which was especially interesting on account of the subclavian involvement. (Published in full on pages 11-14 of this issue.)

Dr. LEWIS A. COFFIN presented a case of **absence of both auditory canals**.

The child had been brought to the Manhattan Eye, Ear, and Throat Hospital to learn if anything could be done for her hearing. She was found to have adenoids and deformity of both external ears. The cartilage was so bound down by adhesions that it could not be determined whether or not it was all present. By palpating back of the tragus, what seemed to be the beginning of a canal could be felt. As the child can hear a watch on contact, can hear her mother calling across the street, and can always understand her mother even when her back is turned, it was thought that there might be a canal, and it was determined to explore. With Dr. HASKINS's assistance, the regular incision for a mastoid operation was done, and the ear pushed well forward, but no sign of canal, no fossa nor indentation, was found. Only one side was explored. The child has no other abnormality, and there is nothing of the kind in the family. The child was operated on on Monday, made a good recovery, and was discharged on Tuesday of the following week. She is very bright,

calls her brothers and sisters by name, and is about to be sent to a hospital for deaf-mutes for education.

Dr. W. C. PHILLIPS said that these cases were rare, although they appear not infrequently in large clinics. He was interested in the subject, because it was an affection that had come into his own family history. A member of his father's family had an ear perfect in shape, but it had never grown since infancy, and is absolutely an infantile ear. There was no external auditory canal, though there was an Eustachian tube and a normal Eustachian opening. There was a clear hereditary tendency in this instance, and he had come to look upon that as holding good in most cases.

Dr. COFFIN said that he had forgotten to state that they did not try to catheterize the Eustachian tube, but that with the finger in the naso-pharynx nothing was found to indicate the presence of the Eustachian eminences. The operation was simply exploratory.

The CHAIRMAN said that these cases were not common but were well understood. They have a little depression and the rest is solid bone. The remainder of the auditory apparatus is healthy. All these patients hear pretty well, and an operation should not be attempted. They are perfectly able to acquire an education.

Dr. PHILLIPS said that he had usually found that the bone-conduction of sound was good.

Dr. JARECKY said that he had recently seen a case of congenital absence of the auditory canals. The bony tissue had been drilled through and a constant serous discharge oozed. The Eustachian tubes were present. The openings through the bone had made no improvement in hearing.

The paper of the evening was by Dr. WILLIAM SOHIER BRYANT on **the value of the present quantitative tests for the hearing, with demonstration of a new apparatus** (described in these ARCHIVES, vol. xxxiii., p. 438, 1904).

Discussion.—Dr. T. J. HARRIS: I wish to thank Dr. Bryant for bringing this subject before us. I do not agree with his apology that nothing new can be said about it, for there is a great deal that we do not know, physiologically and otherwise, and it is an important question for all who are seeking correct methods in ear testing. Dr. Bryant has referred to an important communication made at the Bordeaux Congress by Professor Politzer.

This report is worthy of our careful consideration. After much study on the part of those gentlemen who stand at the head of the profession abroad, they have come to the conclusions that Dr. Bryant has stated. He would further emphasize the point that our knowledge of the cause of bone-conduction is very imperfect, and we can only imperfectly state what our results are when we use the tuning-fork. On account of the doubtful factor of bone-conduction, even the most satisfactory results, according to our methods, leave us in doubt.

An interesting point is that in an independent way many of us in New York have arrived at about the same method of testing reached by Politzer and Gradenigo. I would like to say that in one of our hospitals, the Manhattan Eye and Ear Hospital, we use all the methods suggested by Dr. Bryant. We have a standard watch—as nearly as possible—to be used in the clinics, the acoumeter, the whispered voice, and the tuning-fork. We have since added the Bezold fork for the lower limit, and we still cling to the Galton whistle.

We are in much doubt yet as to the result of our most complete examinations, due to the inability to exclude the other ear, and I was particularly impressed by this when I read a report of an article by Hensen in a recent number of the ARCHIVES. He is a leader in Europe in the physiology of the ear, and he states that in an experiment in which he covered the canal with a soft clay after filling it with sealing-wax, the human voice could be heard several metres distant. If that is the case, our method of plugging with the moistened finger is imperfect, and we should bear that in mind, and also that the bilateral tests suggested by Politzer have a value, while Dr. Bryant's new instrument is perfecting a method which had been previously brought forward. If this method will add anything to our methods for the careful examination and registration of the ear, it ought to receive general adoption.

Dr. GUTTMAN remarked upon the advantage of Dr. Bryant's instrument in that it avoided the metallic quality of the telephone. He thought, however, that the changing value of the cylinders was an objection which has yet to be overcome in order to make the apparatus of general value.

In closing the discussion, Dr. BRYANT said that the apparatus for detecting malingering, with a tube for each ear, either of which can be stopped by the hand of the operator without the

knowledge of the patient, is a very old device. He had made one for himself in 1889.

The Edison people claim that they can produce any number of uniform cylinders. The cylinders will wear out after a time, but they can be renewed at small expense.

The question of keeping out outside noises is an interesting one, but you will find that you can hear some noises—the elevated trains for instance—better through the tubes than without them. The main difficulty is to keep the electric connection and the current of the same intensity in the electric devices.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1903.

By DR. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

(Concluded from p. 545, vol. xxxiii.)

NERVOUS APPARATUS.

445. Treitel. A case of uræmia with deafness. *M. f. O.*, 1903, No. 11.
446. Krause. A remarkable case of abdominal typhoid with central deafness. *Wiener klin. Rundschau*, No. 48, 1903.
447. Anton. A case of bilateral absence of the cerebellum with compensatory enlargement of other organs. *Wiener klin. Wochenschr.*, No. 49, 1903.
448. Hunt and Fraenkel. Tumors of the ponto-medullo-cerebellar space, acoustic neuromata (central neuro-fibromatosis). *Med. Rec.*, New York, Dec 20, 1903, p. 1001.

445. The case is that of a child sick with scarlet fever. Lost its sight and hearing during an attack of uræmia. After five days both senses returned. PIFFL.

446. Report of a case of typical affection of the internal ear in typhoid fever which, as opposed to the views of the author, does not present anything remarkable. WANNER.

447. Anton reports the history and clinical symptoms of a case of a child six and one-half years old, where at autopsy an almost total absence of the cerebellum was found. Locomotion and articulation were acquired very much later than in the case of normal children. The succession of the movements was slow. The collective number of the movements was very small. The preservation of the bodily equilibrium, as well as the preservation

of the direction forwards and backwards, was very much restricted. The author regards these phenomena as defective symptoms. The details of the conditions, as well as the compensatory changes of the rest of the brain, should be read in the original.

WANNER.

448. The tumors press on one or more cranial, nerves usually first the acoustic, then the trigeminal. Their cause is teratological. Rarely bilateral. Five cases are reported, showing a common origin from cranial nerve trunks. Their pathological structure is neuro-fibromatosis, pure or in various stages of transformation. The localities are almost identical, the angle formed by the junction of pons, medulla, and cerebellum. Their symptomatology, because of this localization, is analogous in the essential features. The certainty of localization, the essentially benign nature of the growths, their loose attachment to the meninges and nerve trunks, distinguish this group of intracranial tumors as a most favorable one for surgical interference. In view of all this, the author finds justification for the suggestion to assign a separate place to this grouping of intracranial tumors because of the syndrome first of the auditory and later of adjacent nerves.

W. SOHIER BRYANT.

NOSE AND NASO-PHARYNX.

a.—GENERAL.

449. **Mink.** The nose as an air passage. *Bresgens Sammlung swangl.*, Abh. vii., 5.

450. **Breda.** On bouba of the larynx and of the trachea. *Archivo italiano di otologia e laryngologia*, vol. xv., No. 1.

451. **Ingersoll, J. M.** Supernumerary teeth in the nose and maxillary sinus. *The Laryngoscope*, Sept., 1903.

452. **Makuen, G. H.** Cicatricial deformities in the respiratory tract due to causes other than syphilis and traumatism. *The Laryngoscope*, Oct., 1903.

453. **Barlow, J. W.** Some causes of facial erysipelas from erosion of the nasal septum. *Boston Med. and Surg. Jour.*, Dec. 17, 1903.

454. **MacCoy, A. W.** A clinical study of the use of antitoxine serum (Dunbar's) in hay-fever during the season of 1903. A new and distinct advance in its management. *N. Y. Med. Jour. and Phil. Med. Jour.*, Nov. 21, 1903.

449. After a critical survey of the literature, MINK objects to the assumption from his manometric experiments that the nose simply serves the purpose of heating, moistening, and cleansing

the inspired air. On the basis of Schutter's experiments, which showed that the nose was of importance for every phase of respiration and for an intense metabolism, Mink declares the inferiority of mouth-breathing and respiration through a too patulous nose on account of the defect in the physiological resistance of the nasal air passages. In mouth-breathing, the respiratory movements are decidedly more superficial and shorter, so that the passage of the gases into the lungs is very much interfered with. Less oxygen is received and less CO₂ is given off, so that metabolism suffers in a similar way. The other objections to mouth-breathing are secondary. The nasal air passage adds a decided resistance to the sub-glottic respiratory apparatus by the turbinals of the anterior nasal orifices. The accessory sinuses play important parts as reservoirs for air and heat. An important advantage of nasal respiration depends upon the reflex excitability of the nasal mucosa. Particulars must be read in the original. BRÜHL.

450. This interesting paper treats of a very peculiar disease of the skin—bouba—occurring in Brazil, which attacks the mucous membrane of the nose, the pharynx, the larynx, and the trachea. In one of the fourteen cases observed, in addition to the clinical course the changes in the larynx and in the respiratory passages are described. The pathology and histology are given. The paper is very readable. RIMINI.

451. In a boy, four years old, pain and swelling in the right superior maxillary region, slight exophthalmus on the right side, and obstructed nasal respiration took place. The two upper molars had never erupted. Opening through the right fossa canina liberated foul pus. In curetting, two small molar teeth were brought out. This was a dentigerous cyst in connection with deciduous teeth. In another case, a supernumerary tooth in the maxillary antrum was not discovered during life. The patient had suffered from persistent facial neuralgia. The teeth were all in position. Double pneumonia. Death. In the posterior wall of the right antrum a molar tooth was seen projecting with the crown into the antrum, the roots imbedded in the antrum wall. The patient was forty years old with a history of syphilis. A gumma perforation at the base of the septum and hard palate. Two years later an elevation appeared on the nasal floor, which contained a peg-shaped tooth. Removal.

M. TOEPLITZ.

452. A woman, aged twenty-eight years, had, when five years old, diphtheria followed by a severe attack of scarlet fever, with a unilateral otitis media purulenta which speedily healed, exacerbated after influenza five years ago, with an intermittent discharge ever since. There were marks of extensive ulceration in the pharynx. The posterior oro-pharyngeal wall shows considerable loss of tissue, with web-shaped cicatricial contractions and adhesions between it and the posterior pillars of the palate. The cicatrix extends downward nearly to the entrance of the œsophagus. Passing a thread through the pillar at its outermost point of contact with the pharyngeal wall and leaving it there until the borders have healed, the thread will be removed and the adhesion divided with a bistoury throughout its entire length. Three hundred observers have seen 449 cases of cicatricial deformities in the respiratory tract that appear not to be due to syphilis or traumatism: 16 % from diphtheria, 8 % from scarlatina, 3 % from lupus, 1.6 % from tuberculosis, 1.5 % from scarlatina and diphtheria combined, and a small percentage from typhoid and measles.

M. TOEPLITZ.

453. Erosions of the septum, more common than fissures of the vestibule or ethmoid diseases, were found in three cases of facial erysipelas to have been its starting-point, and their treatment had not only accelerated the cure of the infection, but also prevented the return of other attacks, which had been quite frequent before.

M. TOEPLITZ.

454. MACCOY has instilled the Dunbar serum into the conjunctival sac and nose of fifteen typical cases of periodic hay-fever, six of which are fully reported, with prompt and permanent relief for the season.

M. TOEPLITZ.

b.—METHODS OF EXAMINATION AND TREATMENT.

455. **Sokolowsky.** On previous results with paraffin in deformities of the nose and in retro-auricular defects. *Deutsche med. Wochenschr.*, No. 42, 1903.

456. (1.) **Leiser.** Dangers of embolism in injections of paraffin. *Ibid.*, No. 43, 1903. (2.) **Stein.** Dangers of embolism in paraffin injections—reply. *Ibid.*, No. 48, 1903.

457. **Eckstein.** Injections with vaseline or hard paraffin. *Ibid.*, No. 52, 1903.

458. **Bukofzer.** The reaction of nasal and laryngeal mucous membrane to adrenalin. *Ibid.*, No. 41, 1903.

459. Kirch. The use of adrenalin in severe hemorrhages. *Ibid.*, No. 48, 1903.

460. Okunew. On internal vibratory massage of the mucous membrane in diseases of the nose and of the larynx. *Bolnitschnaja gaseta Botkina* 1896, No. 52.

461. Rogers, A. E. Treatment of cervical adenitis due to tonsillar infection. *Med. Record*, Nov. 28, 1903.

462. Wallace, H. A portable head-rest. *N. Y. Med. Journ.* and *Phila. Med. Journ.*, Oct. 1, 1903.

455. In six cases of deformity of the nose and in three cases of retro-auricular openings, injections with soft paraffin after Gersuny were employed, and, as the illustrations show, very good results were obtained. In order to prevent the lateral displacement of the injection mass along the naso-labial folds, a compression apparatus was employed after the fashion of an eye-glass. Unpleasant accidents, such as have been described by others, have not been observed by the author, with the exception of an attack of erysipelas. He believes that this immunity is due to the fact that he injects fluid vaseline in a semi-coagulated state.

NOLTENIUS.

456. To correct a traumatic saddle-shaped nose, STEIN injected small quantities of fluid soft paraffin six times, and unfortunately immediately following the last injection appearances of collapse and embolism occurred in the left eye which led to permanent blindness. In a criticism of this case, according to Stein, LEISER had disregarded the most usual measures of safeguard. Leiser replies that he acted exactly according to the original instruction of Stein, and declares the accusation incorrect.

NOLTENIUS.

457. ECKSTEIN opposes energetically the objections which Stein makes toward the use of hard paraffin in injections. The author believes that it is impossible to entirely avoid danger of pulmonary embolism, even when, according to the last recommendation, soft paraffin is injected in a semi-coagulated state. With the use of hard paraffin a pulmonary embolism has never been observed, though he himself has performed on 154 patients more than 1000 injections. He never observed necroses of the skin and burns of the skin. The technical difficulties which Stein brings forth against the use of hard paraffin are avoided by using the syringe recommended by the author. Eck-

stein believes in the advantage of his method, and considers the objections to the use of soft paraffin to be actual ones.

NOLTENIUS.

458. Adrenalin, according to the author, is an excellent means to obtain capillary anæmia. It would only arrest hemorrhages in bleeding from capillaries. If a larger vessel is opened, adrenalin does not act at all, unless it is brought directly in contact with the venous wall. Its anæsthetic action is very small. As hyperæmia does not follow the capillary anæmia, after hemorrhages are not very frequent. It is, however, just as well to pack the cavity after nasal operations. Adrenalin is of great service in inflammation of the nasal sinuses, because when brought in the neighborhood of the naso-frontal duct it causes the latter to dilate and enables the discharge to escape. Some authors use it with advantage in nasal asthma. When applied externally it is relatively non-poisonous, but subcutaneous and intravenous injections seem to be very poisonous, so that caution must be exercised.

NOLTENIUS.

459. In a paper on the hæmostatic action of adrenalin a case of very severe and persistent hemorrhage from the nose is of interest. The bleeding did not cease until a piece of gauze saturated in adrenalin solution was firmly packed into the bleeding nostril, and every two hours twenty drops of 1:1000 adrenalin solution were administered internally. The reviewer questions whether in this case the adrenalin really acted as the author claims. It is well known that even in the severest hemorrhages in the nose the bleeding will cease as soon as it is possible to place a sufficiently long strip of gauze directly against the bleeding place, so that the rhinologist is rarely forced to make use of Bellocq's cannula. Moreover, it has been stated correctly that the adrenalin only acts as a hæmostatic in capillary bleedings.

NOLTENIUS

460. Ten cases of nasal affections (six chronic submucous rhinitis, three ozæna, one rhino-scleroma) and six cases of laryngeal affections were treated by the author with massage according to Laker, and only negative results obtained. Massage of the larynx produced, in addition to pain, expectoration and symptoms of irritation, so that at present this method cannot be recommended.

SACHER.

461. To prevent a cervical adenitis, applications of a five-per-cent. aqueous solution of iodine to the crypts is preferable

to the use of antiseptic gargles alone. In acute ulcerative tonsillitis, the best treatment is the removal of the diseased tonsil tissue by cutting well below the floor of the ulcer and then applying a strong antiseptic to the cut surface. Injection of a ten-per-cent. aqueous solution of iodine into the tonsillar crypts, repeated every third day, have produced in chronic cervical lymphadenitis a marked reduction in the swelling of the glands. ROGERS has resorted to extirpation of the glands from without, but only after removal of the tonsil. He relates five cases in which the cervical glands disappeared after removal of the tonsil.

M. TOEPLITZ.

462. The head-rest has the form of a horseshoe, branching into two other horseshoes, and can be attached to any kitchen table. The swivel joints make it adaptable to any size of head, which by means of a fixation screw may be set at any angle.

M. TOEPLITZ.

C.—ACCESSORY SINUSES.

463. Ziem. Iritis and nasal disease. *Arch. internat. d'otol.*, etc., 1903, p. 1173.

464. Richter. A case of latent caries of the sphenoidal sinus with paralysis of the sixth nerve. Treatment from the pharynx. *M. f. O.*, 1903, No. 10.

465. Curtis, H. H. The technique of the maxillary-sinus operation. *The Laryngoscope*, Oct., 1903.

466. Thigpen, C. A. A case of empyema of the frontal sinus. *Journ. Amer. Med. Assoc.*, Nov. 14, 1903.

463. Three cases of iritis which were not improved on the administration of atropine, diaphoretics, and laxatives were promptly healed on opening the suppurating maxillary cavity.

OPPIKOFER.

464. The author was able in this case to palpate the sphenoidal cavity with the finger introduced in the naso-pharynx, as the anterior wall was principally defective. With the aid of a curette he was able by the same way to remove granulations and sequestræ, whereupon the severe disease healed, though its etiology is not quite clear. From the experience of this case and after experiments on the cadaver, the author believes that the sphenoidal sinuses can be most easily attacked from the pharynx, and recommends this method.

PIFFL.

465. After an anatomical description of the antral cavity, CURTIS formulates the indications for operation according to the

different origin of antrum trouble. If a diseased tooth is the cause, the cavity is explored through the socket, and radical operation through the socket or inner wall follows. In acute cases an attempt is made to wash the cavity through the natural opening; otherwise exploratory punctures are made through the nasal wall or the canine fossa, and the opening kept open with obturators. In chronic cases radical operations are strongly advised: (1) through the anterior wall, (2) through the anterior wall with nasal fenestration, (3) radical operation through the inferior meatus; for the last no anæsthetic is necessary. The anterior third of the inferior turbinate is removed with trephine, cutting-forceps, or snare. The trephine perforates the inner wall of the antrum, one centimetre beyond the anterior point of attachment of inferior turbinate, at a point $\frac{1}{4}$ -inch above the nasal floor. The opening is enlarged with the burr.

M. TOEPLITZ.

466. THIGPEN's patient, a male, aged thirty-eight, suffered from headache and vertigo. Thirteen years ago he had an attack of influenza. The left frontal region was more prominent than the right, the left eye was pushed down and out, and there was diplopia. The left nostril contained large polypi bathed in pus, filling the cavity, which were removed, with breaking up at the same time of the anterior ethmoidal cells. The frontal sinus was opened by a median vertical incision, joined by one at right angles just above the brow. Pulsating pus escaped from the cavity. The posterior wall was formed by the dura and brain. Firm adhesions had grown between dura and bone. The dura was covered with granulations which were removed. Drainage was established through the nose. The subsequent course was uneventful. Recovery with obliteration of the cavity took place.

M. TOEPLITZ.

d.—SEPTUM.

467. Winkler. On the correction of crooked noses. *M. f. O.*, 1903, No. 8.

468. Freer, O. T. The window-resection operation. *Jour. Am. Med. Assoc.*, Dec. 5, 1903.

469. Cohn, Felix. The submucous resection of the nasal septum. *Med. Rec.*, Dec. 26, 1903.

467. After tamponing the nose posteriorly, the fold between the mucous membrane of the lips and of the upper jaw is divided

between the spine of the septum and the canine teeth, the mucous membrane is retracted upward and downward, and the nasal floor is exposed. The cover of the septum is then detached as far as necessary, and finally the obstructing cartilage is removed. The curvature of the dorsum of the nose is corrected by a number of blows with the hammer, and the nose is then tamponed on each side. The cases of badly healed fractures of the nose which have been operated upon in this way have healed well, cosmetically and functionally.

PIFFL.

468. FREER has operated 51 patients with deviation of the nasal septum by the window-resection operation. Of these, 31 were young adults, 10 of middle age, and 10 of from twelve to seventeen years old; 43 men and 8 women. In 25 cases the deviation was in the left, in 23 in the right, and in 3 in both nostrils, the deflection being sigmoid antero-posteriorly. Seven deviations followed the entire septum from the tip of the cartilage almost to the posterior border of the vomer. Nineteen deflections were purely cartilaginous, 28 required the removal of both bone and cartilage, and 4 were entirely or mainly bony. Twenty-three were of normal thickness, while 4 were as thin as a visiting card. Twelve had a thick, bony base, which projected upward and usually strongly outward toward the lower turbinal. In 13 cases the cartilage was thick; on 3 deviations only were there exostoses and ecchondroses. In 2 the cartilage was absent over a small area, the mucous covering being in contact. Thirty-seven deflections were angular, 6 were bowed, 5 atypical, and 3 sigmoid. Thirteen presented a dislocation of the anterior inferior angle of the quadrilateral cartilage, so that the anterior end of the cartilage lay across both nostrils. Six deviations seemed to be large exostoses, but proved to be hollow, bony deflections. Thirty-six began in or near the front of the nares, while 15 began near the bone. Fourteen large bony deviations reached nearly to the choanæ. In 5 cases the cartilage was removed extensively from the anterior inferior angle of the quadrilateral cartilage to the bony septum. The operation caused 9 perforations of the septum, 7 of about the size of a pea, and 2 as large as a ten-cent-piece, all more than an inch back. Six perforations occurred in the first fifteen operations, 3 in the last 36 cases. Secondary hemorrhage took place in 2 cases, in 1 two hours after operation, in another in a week. The advantage of the operation lies in

seeing how far back, down, or upward, and how thick the deviation; in the possibility of clearing the nostril, at one sitting, of obstructing bone as well as of cartilage; and in creating the utmost possible space at the point of greatest narrowing. The operation is performed under cocaine, and the patient in a sitting posture. A vertical incision, joined by a horizontal, forms an inverted T, which is made with knives having small blades with half-round edges. For the separation of the mucous membrane, two small, flat knives, with rounded, paddle-shaped, thin, sharp blades, are used; one is bent on the flat. The cartilage is then slit vertically in front of the beginning of the deflection with a round-edged knife. The cartilage is then detached with a dental spatula, or, if too adherent, dissected with the round, flat knives. The skeletonized deflection is now cut through the entire length along the base, with Ingal's pointed cartilage knife. The cartilage, firmly held by the rat-toothed forceps, is cut through the hindmost part with a sharp-pointed, angular knife from above downward, and by another above from behind forward. Remaining portions above and at the base may be cut away with strong punch-forceps. The flaps are then replaced.

M. TOEPLITZ.

469. COHN recommends the submucous resection of the septum for those cases in which the simpler methods, as the saw, drill, or "Asch," are not good. It is suitable for displacements of the whole or greater part of the septum from the median line in the course of either the sagittal or horizontal axis, or in both planes, either C- or S-shaped or combined. The operation is done under cocaine and adrenalin. The cartilage is removed piecemeal. The operation lasts from twenty minutes to two and a half hours. Perforations remaining after the operation are rather frequent, in about 20 per cent. of Cohn's cases. A follicular tonsillitis not unfrequently follows. The after-treatment is very brief.

M. TOEPLITZ.

c.—OTHER DISEASES.

470. Neudörfer. On operative diminution of the nose. *Wiener klin. Wochenschr.*, No. 43, 1903.

471. Casassa. Experimental investigation of X-ray treatment of ozæna. *Archivio italiano di otologia*, etc., vol. xvi., No. 4.

472. Richter. Vicarious nasal hemorrhage. Hystero-epileptic attacks. *M. f. O.*, 1903, No. 11.

470. A transverse incision through the movable septum is made very near to its attachment to the tip of the nose. Then the cartilaginous septum is divided in the directions so that the section terminates underneath the skin of the dorsum in the neighborhood of the tip of the nose. Then with a specially constructed periosteal elevator the skin of the dorsum of the nose is elevated at the right. The excessive cartilage and bone are removed with the chisel. If the dorsum of the nose is too broad, the lateral walls are made smaller with a cutting forceps. The anæsthesia consists in the injection of 1ccm of Schleich's solution and three drops of adrenalin.

WANNER.

471. From his clinic and bacteriologic investigations, the author concludes that radio-therapy has a decidedly bactericidal action in ozone, and that it presumably exerts a certain influence upon the glandular system.

RIMINI.

472. Two cases are reported which are most interesting and which throw some light upon disputed questions. In one patient, a woman, there was severe epistaxis with pain in the abdomen and hystero-epileptic convulsions. These symptoms disappeared upon replacing the (retroflexed) uterus and the cessation of previous profuse menstruation. Subsequently, however, after absence of the menses, repeated nasal hemorrhages and convulsions occurred, which ceased upon correcting the position of the uterus and upon the onset of menstruation. The second case was an unmarried woman of thirty-six, externally well developed. Instead of menstrual periods in her eighteenth year at regular intervals, there were nasal hemorrhages with severe pain in the abdomen, back, and attacks of migraine. Gynæcological examination revealed an absence of the vagina, and uterus and left ovary were rudimentary. The author finally recommends the artificial creation of nasal hemorrhage from the anterior part of the septum, as an easy means of depleting for therapeutic and diagnostic purposes.

PIFFL.

f.—THE NASO-PHARYNX.

473. Depangher. A suitable instrument to remove adenoids. *Wiener klin. Rundschau*, No. 47, 1903.

474. Fischer. A case of naso-pharyngeal polypus. *La presse oto-laryngologique Belge*, 1903, No. 12.

475. King. A method of rapid extirpation of naso-pharyngeal fibromata with report of cases. *N. Y. Med. Jour.*, and *Phil. Med. Jour.*, Dec. 19, 1903.

473. A forceps-like needle-holder which is bent at an angle and somewhat broader. The action is similar to the instrument of Schutze. The forceps is apparently not any better than the instruments at present in use, and the advantages which the author proclaims are surely not correct.

WANNER.

474. A fibroma as large as a hen's egg was removed from the naso-pharynx with Gottstein's curette. This simple procedure is recommended for the many cases in which it is possible to introduce the ring of the instrument between the soft palate and the tumor, and in which there are no adhesions of the processes of the polypus.

BRANDT.

475. Three cases of naso-pharyngeal fibromata which sent processes into the nose and accessory cavities, and occurred in adolescence, were operated by KING.

In the *first*, a mulatto, aged twenty years, the tumor was attacked with long scissors introduced into the nose under cocaine and removed en masse. The point of origin was the vault of the pharynx and the upper margin of the right posterior choana. No recurrence took place.

In the *second*, a boy of fourteen years had a fibrous growth in the naso-pharynx with prolongation into the right nasal fossa. After preliminary tracheotomy, the tumor was cut through with scissors plied through the right nostril, while the patient was in the Rose position, and the middle and index fingers were placed through the mouth behind it. The naso-pharynx was packed, the tracheal tube removed, and the wound closed with sutures. No recurrence. Microscopically a fibro-sarcoma, clinically a fibroma, was diagnosticated.

The *third case*, a boy, fifteen years old, had an exceedingly ugly vascular fibroma attached to the pharyngeal wall with a prolongation into the right fossa and a rounded movable fibrous tumor in the right cheek, of the size of a walnut. A part of the tumor was removed under cocaine and revealed a telangiectatic fibroma. After ligation of the right external carotid and passing ligatures under both common carotids, tracheotomy was made, the tumor removed in Rose's position under an overwhelming hemorrhage, controlled by packs, followed by saline infusion. The tracheotomy wound was closed and the compression of the common carotids removed. The vomer was found to be completely crowded to the left side. The tumor in the

cheek was not removed. Recurrence took place involving the antrum and perhaps the pterygo-maxillary region.

M. TOEPLITZ.

SOFT PALATE, PHARYNGEAL AND BUCCAL CAVITIES.

476. **Busch.** On the treatment of post-diphtheritic paralysis. *Wiener med. Presse*, No. 50, 1903.
477. **Foderl.** On plastic operations on the palate with use of the nasal septum. *Wiener klin. Wochenschr.*, No. 44, 1903.
478. **Pénaire and De Mars.** Fibro-myxoma of the pharynx. *Arch. internat. d'otol.*, etc., 1903, p. 1255.
479. **Reitmann.** On the occurrence of cartilage and bone in the palatal tonsils. *M. f. O.*, 1903, No. 8.
480. **Quiz.** A new method of testing the sense of sight. *La presse otolaryngologique Belge*, 1903, No. 11.
481. **Russakow.** A case of macroglossia. *Djetskaja Medicina*, 1903, No. 3.
482. **Robertson, C. B.** Removal of the faucial tonsil. *Journ. Amer. Med. Assoc.*, Nov. 28, 1903.
483. **Wood, G. B.** The complications of hypertrophy of the pharyngeal tonsil. *Amer. Med.*, Oct. 3, 1903.
484. **Steers, W. H.** An operation for removing the tonsil. *Med. Rec.*, Oct. 3, 1903.
485. **Ward, N. G.** Syphilitic pharyngeal abscess with necrosis of a cervical vertebra. *Med. Rec.*, Oct. 3, 1903.
486. **Mosher, H. P.** The tonsil at birth. *The Laryngoscope*, Nov., 1903.
487. **McKinney, R.** Delayed secondary hemorrhage following amygdalotomy. Report of two cases. *N. Y. Med. Jour.* and *Phil. Med. Jour.*, Dec. 26, 1903.
488. **Swain, H. L.** The arch of the palate. *The Laryngoscope*, Oct., 1903.
489. **Koplik, H.** Tuberculosis of the tonsils, and the tonsil as a portal of tubercular infection. *Journ. Am. Med. Science*, Nov., 1903.

476. In a case of post-diphtheritic paralysis with anæsthesia of the soft palate, after all other methods of treatment were without avail, complete recovery took place in fourteen days after the use of heretin—five drops in milk, six times daily.

WANNER.

477. After resection of the superior maxillary, a flap was built out of the septum corresponding in size to the defect in the palate, and, with the finger introduced in the opposite nostril, is pressed down and then sutured to the soft palate and the mucous membrane of the cheeks. Two cases are described in which the maxillary cavity was resected on account of carcinoma, and the

buccal cavity was closed off by this same flap. In order to lessen the danger of necrosis, it is advised that this flap be formed in two sittings under the use of a cocaine and adrenalin mixture.

WANNER.

478. Fibro-myxoma originating in the posterior pharyngeal wall and occluding the right choana. Removal with the knife. Recovery.

OPPIKOFER.

479. Three human embryos and fifty palatal tonsils, belonging to thirty-seven individuals of various ages were examined in serial sections, and it was found that in thirty-four per cent. cartilage or its derivatives were present. The cartilage was generally hyalin. Fragments were situated free without any attachment with bony structure in connective tissues. The condition in one embryo suggested that it is probably a derivative of the second branchial arch.

PIFFL.

480. The substances sugar, salt, quinine, and acetic acid are made up in $\frac{1}{4}$ % gelatine solutions. Drops of this fluid diffuse very slowly on the moist surface of the tongue, while the sensation of taste is more rapidly perceived than the fluidification. By the aid of this method the topography of the sense of taste can be more exactly studied, and the author was able to determine that in the neighborhood of the pharyngeal extremity of the tube sweet and bitter were perceived but acid and salt were not.

BRANDT.

481. A boy of five years suffered a small injury to his tongue by a fall. After three or four days the temperature rose, the tongue became very much swollen, and the submaxillary glands were involved. In the course of the next month the swelling diminished somewhat but then remained stationary for six months. The tongue was enlarged in all dimensions, 4cm long, 5cm broad, and 2cm thick. All surfaces were uneven, granular, especially in the median line. After resection of a wedge-shaped piece the tongue became somewhat smaller, and in about another month reached its former size. The microscopic examination of the excised piece showed a lymphangioma of the tongue. The author believes that the lymphangioma was congenital and first became noticed after the injury.

SACHER.

482. ROBERTSON uses a pair of scissors of his own device which can be thrown apart with the least possible motion of the well curved handles, the blades being bent on their long axis.

He separates the pillar with a double-edged, dull-pointed bistoury, curved on the flat. M. TOEPLITZ.

483. Among 361 patients, 149 suffered from adenoid hypertrophy, which are tabulated : 87 were boys and 62 girls. Nasal discharge or recurrent attacks of coryza were present in 78 cases, ear trouble 63 times, otorrhœa 24 times, earache 53 times, deafness 12 times. This does not represent the correct proportion of ear complications, since most cases go to ear clinics. Nasal obstructions were seen in 117 cases, headache in 28, cough in 48 cases. M. TOEPLITZ.

484. STEERS removes hypertrophied tonsils, which are enveloped in the faucial pillars or held by adhesive bands, under anæsthesia by means of knife and hook. He tries first with the finger to detect pulsating vessels, then draws the under tonsil with a volsellum forceps toward the opposite side. The knife, shaped like a strabismus hook, is passed between the tonsil and anterior pillar beneath the basement membrane, avoiding the tonsil mass. The mass is shelled out with the finger and its attachment to the posterior pillar is separated by the blunt-pointed tonsil bistoury. Bleeding vessels are seized with forceps. M. TOEPLITZ.

485. A woman, aged forty-nine, had three weeks after her last confinement, twelve years ago, the first signs of syphilis on the genitals. Six years later a syphilid appeared on neck, chest, and entire body. Then followed ulcerations on both legs, left malar bone, and a severe iritis. Five years ago all lesions had healed, except three ulcers of the right shoulder and one on the posterior wall of the pharynx. This was about $\frac{1}{4}$ inch in diameter, surrounded by soft pulpy granulations and covered with yellow, foul-smelling pus. At the bottom was a sinus from which pus constantly exuded. A probe was passed down to the cervical vertebra, but no necrosis was detected. The patient could not lie down for six months. Sleep was lost owing to the pain, gnawing in character, which was worse at night, preceding and during stormy weather, and most marked on the left side. She had to steady her head when getting up or sitting down. After two months a small piece of bone was seen protruding in the sinus; it was gradually loosened, and after five weeks removed with forceps. It measured $\frac{1}{4}$ by 1 inch and was full of holes like worm-eaten wood. The sinus did not heal. After three months another piece of bone protruded and was extracted

a month later. It was $\frac{1}{2}$ inch square and full of holes. The ulcer now healed firmly. A depression remained, but no other lesions appeared in four years. For treatment wine of iodine was given and well borne, since the stomach had rebelled against iodides and mercury.

M. TOEPLITZ.

486. MOSHER draws the following conclusions: At birth both the tonsillar fossa and the form of the tonsil are very variable. Irregularity in the closure of the tonsillar cleft accounts for the greater number of the variations—especially does it explain the occurrence of double or triple tonsillar openings. These multiple openings explain the lobulations of the tonsil into two or even three lobes. The tonsillar opening is found to be double in one-fourth of the cases. The typical tonsil has a vertical axis with an anterior fossa starting from the root of the axis and a posterior fossa which starts back of the axis from the opening of a follicle. In about half of the cases the posterior fossa is absent. The extent of the two fossæ explain the size and the attachment of the plica triangularis in the adult tonsil. At birth the tonsillar opening and the tonsil are practically horizontal, being more a part of the palate owing to the growth of the face downward, forward, and inward. As a result of this the plica is carried from a horizontal to a vertical position. The supra-tonsillar fossa undergoes a like change of position.

M. TOEPLITZ.

487. MCKINNEY reports two cases of severe secondary hemorrhage, occurring in two boys of ten and seven years respectively, three and a half days after tonsillotomy. Both hemorrhages ceased spontaneously.

M. TOEPLITZ.

488. Other causes than nasal disuse and traumatism contribute to the excessive arching of the palate and lack of room for the full-grown septum. The shape of the skull determines the kind of arch possessed by any individual. Among 102 original Hawaiian skulls, 24 selected as normal had an index of 45.7. The measurements of Flathead Indians, who have for generations deformed the heads of their children by a binding process during the first year of their lives, showed a height-breadth index of 73.2; the average for European races was 52.6 and 63.5. The septum is straight in the photographs. The adult flat-head skulls show more deformity than the child skulls. SWAIN concludes: (a) that deforming processes which artificially alter the shape of the skull may produce a change in form and

shape of the hard palate; (*b*) that the septum seems to conform itself to the altered development of the rest of the face; (*c*) that from arrested development of the superior maxilla the palate fails to descend to its proper level; (*d*) that abnormalities of the palate are principally caused by the lack of proper aëration of the maxillary sinuses retarding the development of the superior maxilla; (*e*) that the conservation of the deciduous teeth helps to produce a normal horizontal curve in the hard palate.

M. TOEPLITZ.

489. After a brief review of the literature, KOPLIK reports a case of apparently primary disease of the tonsil, in which the development dated from an exposure to infection. In a male child, aged fifteen months, both tonsils were involved; one tonsil showed a distinct tubercular ulceration, and scrapings therefrom revealed a large number of tubercle bacilli. The granulations showed tubercles with giant-cell formation. The examination of the extirpated left tonsil showed the same tissue and bacilli, and also the lymph nodes. The grandfather, suffering from pulmonary tuberculosis, was a good deal with the child. The tonsils and adenoids were removed, but the old ulcers and pseudo-membranous coating reappeared on the left tonsil four weeks after the operation. The child died, three weeks after extirpation of the cervical lymph nodes, with signs of tuberculosis of the right lung and also of the larynx.

In the second case, a female, aged twelve years, there was a packet of tubercular lymph nodes on the left side of the neck without any accompanying lesion. The enlargement of the lymph nodes dates from an infection of the tonsil. The advanced nodes were cheesy, high up behind the tonsil, adherent to the internal jugular, and broken down, containing numerous tubercle bacilli.

A third case, a male child, aged eight years, was an evident one of infection through the tonsil of the cervical lymph nodes, resulting ultimately in a general acute miliary tuberculosis. When first seen, it had all the symptoms of tubercular meningitis. The lymph nodes of the left side of the neck at the angle of the jaw were enlarged. After death the tonsil was extirpated and found to be the seat of tubercular changes and bacilli, as also the enlarged nodes, which were the oldest seat of tubercular infection in the body. The lungs showed acute miliary tuberculosis. The glands were not affected.

M. TOEPLITZ.

ARCHIVES OF OTOTOLOGY.

THE DISTRIBUTION OF BLOOD-VESSELS IN THE LABYRINTH OF THE EAR OF THE SHEEP AND THE CALF.

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[FROM THE HULL LABORATORY OF ANATOMY OF THE UNIVERSITY OF CHICAGO.]

(With three figures on Plates XXI. and XXII.,^{1 2 3} from German Edition (*Zeitschr. f. Ohrenheilk.*), Vol. XLVIII., issued Nov., 1904.)

WHEN working out the circulation in the labyrinth of the ear of the domestic pig¹ I noted several striking variations in the course of the blood-vessels, from that described by Siebenmann and others for the human ear. The perfect injections I was able to obtain of the vessels in the labyrinth of the pig left no doubt of the correctness of the observations I had made. The question naturally presented itself whether these variations were not due to differences in the different species studied.² In order to determine this question I made several preparations of the blood-vessels

¹ *The Distribution of Blood-vessels in the Labyrinth of the Ear of Sus Scrofa Domesticus*, Decennial Publications, University of Chicago, University Press, Chicago, 1903.

² Siebenmann, in a review of the above work which appeared in the *Zeitschrift für Ohrenheilkunde*, Band xlv., S. 143, suggests that the absence in my preparations of large veins from the semicircular canals which left the labyrinth along the aquæductus vestibuli was due to the destruction of these vessels, which he found lay in separate canals of the capsule, by the rapid corrosion and subsequent removal of the capsule in fragments with forceps. The answer to this criticism is: In the first place, in my preparations no break existed between the veins from the semicircular canals and the large veins of the vestibule which emptied into the vena canaliculi cochleæ just as I represented in the drawings; in the second place, I made a large number of preparations of young embryos in which the capsule was still cartilaginous and was not removed, and in these preparations the distribution of the veins of the semicircular canals was exactly as found in those where the capsule was removed.

in the labyrinth of the sheep and of the calf. Between these and the pig I was able to note variations as striking as those found between the pig and the description in the literature of the vessels in the human ear. I have since made a series of preparations of the blood-vessels in the labyrinth both of the sheep and the calf. The following is a description of the course of the blood-stream as found in the labyrinth of these two species:

SHEEP—FIG. 1.

Arteries.—The first branch of the labyrinthine artery is the anterior vestibular artery, a large trunk which follows the course of the ramus utriculo-ampullaris and supplies the macula acustica utriculi and the anterior crura of the superior and lateral semicircular canals. The second branch, lying parallel with and beneath the ramus ampullaris posterior, supplies the ampulla and the posterior crus of the posterior semicircular canal. The third branch, lying parallel with this, supplies the posterior crus of the lateral semicircular canal and the crus commune. In a few preparations a single vessel, the posterior vestibular artery, takes the place of these two vessels. The arteries for the most part cling to the concave surface of the osseous tube.

The branches that supply the cochlea are two in number, and are practically free from the anastomotic loops so prominent in the arteries at the base of the cochlea in the pig and the calf. Radiating on the under surface of the basal coil were seen a few arterial twigs; one of these left the labyrinth along the canaliculus cochleæ. The first arterial trunk to the cochlea supplies but the proximal half of the basal coil. The other arterial trunks supply the remainder of the coils of the cochleæ. The number of arteries radiating over the scala vestibuli are eighteen.

Veins.—All the venous blood from the labyrinth of the sheep's ear is collected into a single vessel, the vena canaliculi cochleæ. There were no veins in the meatus acusticus internus that received tributaries from the cochlea and no veins left along the aquæductus vestibuli.

All the veins from the vestibule and the semicircular ca-

nals are collected into a single large trunk, the vena vestibuli posterior, which empties into the vena canaliculi cochleæ. An anterior vestibular vein is wanting and the blood from the macula acustica utriculi and the anterior crura of the lateral and superior semicircular canals is collected by tributaries of the posterior vestibular vein (see Fig. 1). In the semicircular canals the venous trunks cling to the concave side of the membranous canal, just as I found in the pig. When the vein reaches the ampulla of the semicircular canal it arches over the dome of the convex surface of the ampulla (see Fig. 1) just as Siebenmann found in the human ear, with this difference, however, that the vein clings to the membranous ampulla and is not embedded in the endosteum of the ampulla, as Siebenmann described. This course is quite different from that taken in the ear of either the pig or the calf.

In the cochlea the following arrangement of venous trunks was observed: The vena spiralis posterior consists of but a single long vessel, which collects the blood from the entire extent of the basal coil. A separate branch for the distal end of the basal coil, as I found in the pig, and as Siebenmann described for the human ear, was absent. About the middle of the basal coil a large tributary empties into the posterior spiral vein. This trunk collects the blood from the upper coils and occupies the position of the anterior spiral vein, as described by Siebenmann—that is, it lies along the inner margin of the scala vestibuli.

The membrana vestibularis is richly supplied with blood-vessels. The arteries in many places could be traced as branches from the vessels arching over the scala vestibuli while the veins joined those of the lamina spiralis.

The spiral character of the vessels lying under the organ of Corti is more pronounced than the same vessels in the pig; these consist of two parallel vessels. Connecting vessels between the outer spiral vein and the veins of the ligamentum spirale were noted at irregular intervals, just as I found in the pig.

The aquæductus vestibuli is encased in a network of capillaries which drain into the posterior vestibular vein. A

small arterial twig from the posterior vestibular artery runs out along the aquæductus vestibuli, just as found in the pig.

CALF—FIGS. 2, 3.

Arteries.—The first branch of the labyrinthine artery in the calf is the anterior vestibular. It takes the same course and supplies the same parts as the anterior vestibular artery in the pig and the sheep. The trunk of the labyrinthine artery is often wound in a characteristic manner about the nervus cochleæ. Its direction is opposite to the coils of the cochlea (see Fig. 2), and in this respect it differs from the course of the labyrinthine artery in the pig. In the bottom of the meatus acusticus internus the labyrinthine artery breaks up into a dense network of anastomotic loops, which are much more complicated than the anastomotic loops found at the base of the cochlea in the pig. From this anastomotic network arise two arterial trunks which run back to supply the vestibule. One trunk supplies the posterior crus of the posterior semicircular canal, the other supplies the posterior crus of the lateral semicircular canal and the crus commune. In several preparations a single vessel, the posterior vestibular artery, takes the place of these two trunks. In the semicircular canals the arterial trunks are found lying in the endosteum of the concave surface of the osseous canal.

Spread over the under surface of the basal coil are a number of arteries radiating from the network of vessels in the bottom of the meatus acusticus internus. One of these arteries runs out along the canaliculus cochleæ. These arteries always lie external to the veins on the under surface of the basal coil. From the anastomotic network at the base of the cochlea arise the arteries which supply the coils of the cochlea. The number of arteries which arch over the scala vestibuli are from thirty-eight to forty.

Veins.—All the veins in the labyrinth of the calf drain into a single trunk, the vena canaliculi cochleæ, just as in the pig and the sheep, with the exception, however, that the vein of the crus commune often leaves the labyrinth along the aquæductus vestibuli. There are no veins in the mea-

tus acusticus internus which receive tributaries from the cochlea.

The venous blood from the vestibule is collected by two large trunks, the posterior and the anterior vestibular veins. The posterior vestibular vein collects the blood from the posterior crura of the posterior and the lateral semicircular canals and from the crus commune. It empties into the vena canaliculi cochleæ. The anterior vestibular vein collects the blood from the macula acustica utriculi and the anterior crura of the superior and the lateral semicircular canals, just as in the pig, and, arching over the anterior surface of the recessus sphæricus it empties into the vena canaliculi cochleæ. In a number of preparations the vein of the crus commune, instead of joining the posterior vestibular vein, curves around the anterior margin of the crus commune to leave the labyrinth along the aquæductus vestibuli. In some preparations, too, a small vein lying on the posterior surface of the crus commune left the labyrinth along the aquæductus vestibuli (see Fig. 3).

In the semicircular canals, the relation of the veins and capillaries is the same as that found in the pig and the sheep; they lie only in the walls of the membranous canal. At the proximal end of a semicircular canal the vein does not arch over the dome of the ampulla, as occurred in the sheep, but it takes a course straight across the base of the ampulla, to join the main venous trunk, just as I found in the pig.

In the cochlea, the vena spiralis posterior collects from the proximal two-thirds of the basal coil, as in the pig. A vein corresponding to the anterior vestibular vein, described by Siebenmann, is present for a large part of the coils of the cochlea.

The membrana vestibularis is well supplied in the calf with a network of vessels, which communicate on the one hand with those of the lamina spiralis, and on the other join the vessels which radiate over the scala vestibuli as well as those of the stria vascularis. In a well-injected embryo, 32cm long, the following interesting relations of the veins of the cochlea were noted: at a number of points throughout the

basal and middle coils the veins that collect the blood from the scala vestibuli did not arch back over the scala vestibuli, as shown in the illustrations for the labyrinth of the pig, but they ran back along the membrana vestibularis to the lamina spiralis, receiving tributaries from the stria vascularis as well.

The spiral character of the vessels under the organ of Corti is as well pronounced in the calf as in the sheep. These consist of two parallel vessels, with communication at intervals, as was found in the pig and the sheep, between the outer spiral vessel and those in the ligamentum spirale.

The aquæductus vestibuli is supplied by a small artery, a branch from the posterior vestibular, just as in the pig and the sheep.

An interesting anomaly in the arterial supply to the semicircular canals occurred in the labyrinth of a 22 cm embryo. In an embryo calf of this age the capsule of the labyrinth is still in the cartilaginous state, and in making the celloidin cast of the injected labyrinth the whole preparation, including the capsule, can be cleared in creosote. If such a preparation is studied through the stereoscopic microscope, it will be seen that the solid mass of the capsule wedged in between the arches of the three semicircular canals is penetrated by canals carrying arteries, and that these canals enter the capsule from its external surface, which is embedded in the spongy bone forming the upper ridge of the temporal bone, just external to the semicircular canals. One canal which entered the capsule from this surface carrying an artery ran straight forward, without anastomosing with any other vessel of the capsule, to the distal end of the crus commune. Here the artery divided into three divisions, one for each of the two semicircular canals, while the third branch ran down the anterior surface of the crus commune to its base. The vein of the crus commune in this preparation emptied into the posterior vestibular vein. Among twenty labyrinths from the calf that were studied, this relation of the arteries was found in but the one preparation, and probably exists only as an anomaly. It is of interest to note in this connection that Sappy described an artery

Labyrinthine Blood-Vessels in the Sheep and the Calf. 77

which entered the compact bone between the three semicircular canals from the upper border of the temporal bone, sending branches also to the membranous canals.

A comparative study of the blood-vessels in the labyrinth of the pig, the sheep, and the calf, leads to the following conclusions:

1. The scheme for the arterial supply to the vestibule and semicircular canals is a constant one, and consists, first, of a separate branch of the labyrinthine artery, the anterior vestibular artery, which supplies the macula acustica utriculi and the anterior crura of the superior and lateral semicircular canals; second, of a single trunk, the posterior vestibular artery, or of two trunks, which come from the labyrinthine artery at the base of the cochlea and supply the posterior crura of the posterior and lateral semicircular canals and the crus commune. A small artery, a branch of the posterior vestibular artery, leaves the vestibule along the aquæductus vestibuli.

2. Anastomotic loops between the several branches of the labyrinthine artery in the bottom of the meatus acusticus internus and at the base of the cochlea were most pronounced in the labyrinth of the calf, and least in that of the sheep.

3. The scheme for the arterial supply to the cochlea varies widely in its details for the three species. In the sheep and the calf, branches from the labyrinthine artery radiate over the under surface of the basal coil, and one of these small arteries left the labyrinth along the canaliculus cochleæ. In the labyrinth of the pig, the arteries under the basal coil were not found, and the vessels about the canaliculus cochleæ were embedded in the capsule, and were consequently destroyed by the corrosion, except in young embryos where the capsule was still cartilaginous and did not require removal in making the celloidin casts. Yet in the latter preparations I was unable to find an artery leaving along the canaliculus cochleæ.

4. Between the spiral vessels lying under the tunnel of Corti and the vessels in the ligamentum spirale communica-

tions were found in all three species. These consist of small, straight veins, which appear at irregular intervals.

5. The *membrana vestibularis* is supplied with a network of vessels in the sheep and the calf, but in the pig no vessels were found in this structure.

6. The venous blood from the cochlea in all three species empties into the *vena canaliculi cochleæ*. In none were any veins found in the *meatus acusticus internus*, which received tributaries from the cochlea.

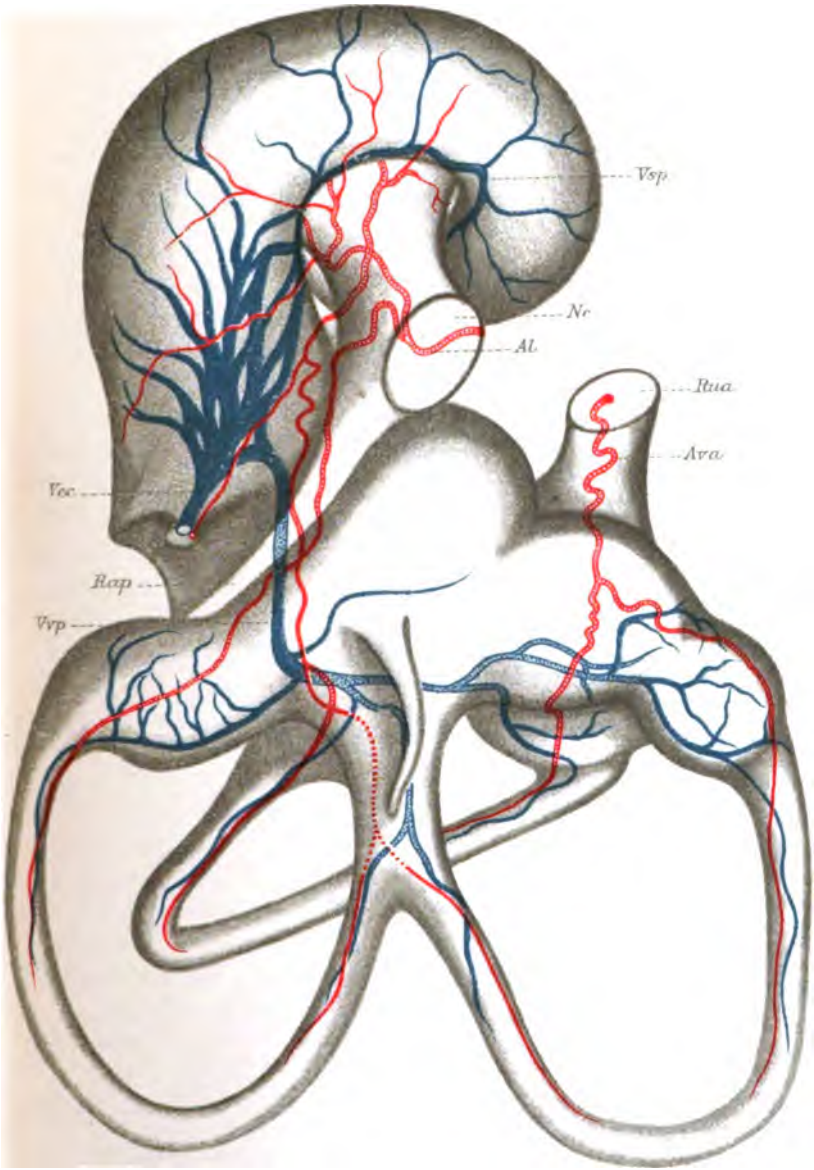
7. In all three species, the venous blood from the vestibule and the semicircular canals drains into the *vena canaliculi cochleæ*, with this exception, that in the calf the vein from the *crus commune* often leaves the labyrinth along the *aquæductus vestibuli*.¹

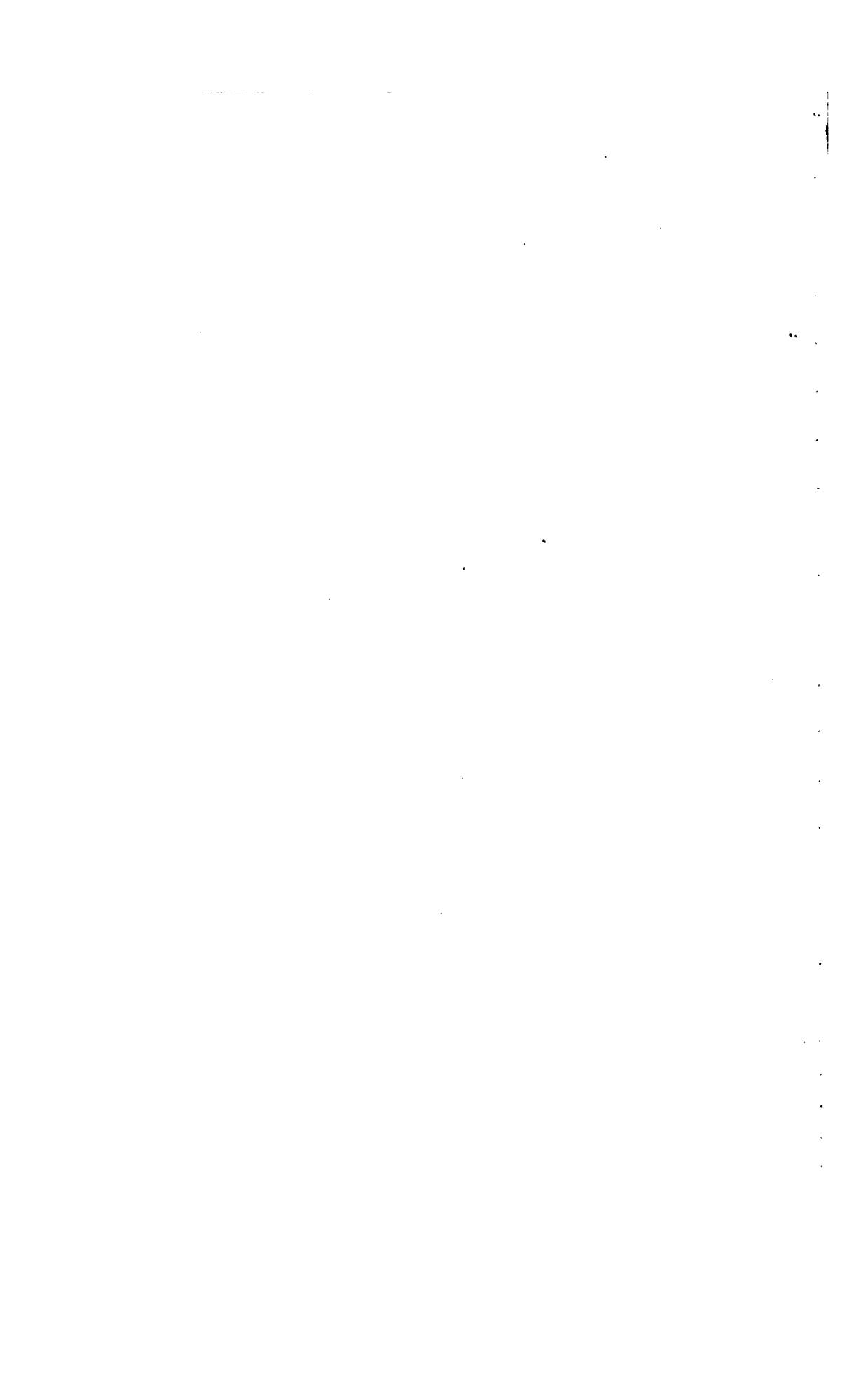
8. Two large veins, the anterior and the posterior vestibular veins, collect the blood from the vestibule and the semicircular canals in the pig and the calf, their distribution being the same as for the anterior and posterior vestibular arteries respectively. In the sheep, the anterior vestibular vein is wanting, its place being taken by the posterior vestibular vein which collects the blood from the whole of the vestibule and the semicircular canals.

9. The location of the vessels in the semicircular canals in all three species is the same. The arteries for the most part cling to the endosteum, lying along the concave side of the osseous canal; the veins and the capillaries are confined to the membranous canals. This differs from the descriptions and the illustrations that appear in the literature where the veins and capillaries are represented as lying in the endosteum of the osseous canals and in the ligaments of Rüdinger. In all of my preparations, the large size of the membranous canals as compared with the osseous canals was such as to give the impression on first studying them that the vessels which encased the membranous canals were in the endosteum of the osseous canals. On closer study of the preparations with the stereoscopic microscope, and by mak-

¹ Siebenmann found in the human ear that the veins from all the semicircular canals united into a common trunk, which left the labyrinth along the *aquæductus vestibuli*.

Fig. 1





ing cross-sections of the semicircular canals, I was able to demonstrate definitely the fact that only the arteries lay in the endosteum, while the veins and capillaries were distributed to the membranous canals, as shown in Plate xii., Figs. 1 and 2, of the article on the blood-vessels in the labyrinth of the pig.

EXPLANATION OF PLATES.

FIG. 1.—*Vcc*, vena canaliculi cochleæ; *Rap*, ramus ampullaris posterior; *Vvp*, vena vestibuli posterior; *Vsp*, vena spiralis posterior; *Al*, arteria labyrinthi; *Rua*, ramus utriculo-ampullaris; *Ava*, arteria vestibuli anterior; *Nc*, nervus cochleæ.

FIG. 2.—*Vcc*, vena canaliculi cochleæ; *Vvp*, vena vestibuli posterior; *Av*, aquæductus vestibuli; *Nc*, nervus cochleæ; *Al*, arteria labyrinthi; *Rap*, ramus ampullaris posterior; *Vva*, vena vestibuli anterior; *Rua*, ramus utriculo-ampullaris; *Ava*, arteria vestibuli anterior.

FIG. 3.—*Vcc*, vena canaliculi cochleæ; *Vvp*, vena vestibuli posterior; *Av*, aquæductus vestibuli; *Nc*, nervus cochleæ; *Rap*, ramus ampullaris posterior; *Vva*, vena vestibuli anterior; *Rua*, ramus utriculo-ampullaris.

THE ANATOMY OF THE CHILD'S EAR, EMPHASIZING POINTS OF PRACTICAL IMPORTANCE.¹

BY DR. W. SOHIER BRYANT.

THERE are many important points in the anatomy of the child's ear which are well brought out by comparison with the adult.

The diagrams you see were furnished through the courtesy of Dr. B. Alexander Randall, of Philadelphia. They show the general appearance of the infantile and adult temporal bones. After exhibiting the lantern-slides and skulls loaned by Dr. Herman Knapp, anatomical specimens I have prepared through the kindness of Professor Huntington will be handed round.

At birth the temporal bone is loosely connected with the other cranial bones, and is all made up of soft and spongy bone, mostly diploic, except the capsule of the labyrinth, which is dense bone. The bone gradually forms cortical layers, and at the close of the first year is quite solid, though still thin. At first the temporal bone is very vascular and is traversed by many foramina containing vessels which allow very free circulation of the blood between all the surfaces of the bone. The chief of these is the petro-squamosal foramen. The temporal bone can readily be divided into its petro-mastoid and squamo-tympanic parts, which are separated by wide sutures. The annulus tympanicus is firmly attached by its apices to the outer plate of the squa-

¹ Read at meeting of the New York Academy of Medicine under the auspices of Section on Otology, December, 1904.

mous bone. But the petro-mastoid portion is still separated from the squamous by a cartilaginous plate, and the petro-tympanic suture is wide open; but before the end of the first year all the parts are united.

In the new-born infant the mastoid antrum is about 8*m* long from the tip of the short process of the incus. The adult is about 11*m* long, measured in the same way. In the infant the walls are of spongy bone, and the outer one made by the posterior process of the outer plate of the squama is softer and thinner than the tegmen, which explains the readiness with which post-aural abscesses occur in infancy. The mastoid process is not yet formed, but its future site is indicated by a flat tubercle, and its development begins about the second year, after which it grows chiefly from an increase of diploë till the time of puberty, when it grows rapidly, and the air cells are completely developed. At birth the upper part of the antrum may be encroached upon by trabeculæ enclosing cells. Small cells may appear in the base of the process as early as the third year. The mastoid process is completely developed shortly after puberty. The groove for the sigmoid sinus becomes noticeable about the end of the first year, and its development is completed at puberty in company with the cells of the mastoid process. At birth the sigmoid sinus is always placed well behind the tympanum and never approaches the meatus, and the bone between it and the mastoid antrum is comparatively thick.

At birth the lower and outer walls of the facial canal are wanting where it crosses the tympanum above the oval window. The osseous Eustachian tube is also wanting. The tympanic cavity proper is about as extensive as in the adult, measuring 14*m* parallel to the malleus handle. Sieve-like bone separates the floor of the tympanum from the carotid canal, and from the jugular fossa which is located directly below and not behind the tympanum. The oblique position of the meatus and this thin plate of bone allow a puncture of the jugular bulb during paracentesis. The osseous labyrinth, the ossicles, and the sulcus tympanicus are fully developed, and, together with the facial canal, are in their permanent relative positions. The tympanum proper changes

very little after birth, but its accessory cavities, the mastoid system and Eustachian tube, undergo development. The tympanic muscles also grow much larger.

The osseous external auditory meatus does not exist at birth, and the suprameatal spine is not yet developed. During the second year, the tubercles of the annulus tympanicus have enlarged sufficiently to meet and enclose the foramen of Huschke, which gradually closes and is usually obliterated after the fifth year.

Development of the whole temporal bone is complete soon after puberty.

The external auditory meatus at birth measures about 13*m* on the upper wall and 19*m* on the lower; the adult, about 29 and 35*m* respectively. It is not closed by agglutination of its walls as in the young of the lower mammals, but there is a simple coaptation of the inferior and superior walls and the membrana tympani with the inferior wall. The irregularities are filled with desquamated epithelium, and the lumen or air space of the meatus does not exist. In a few days after birth the meatus slowly opens, forming an hour-glass-shaped canal flattened above and below with a constriction corresponding to the isthmus of the canal of the adult. This hour-glass, which is large at the inner end to fit the size of the annulus, retains foreign bodies with more tenacity than the adult meatus. The axis of the external meatus is directed slightly upward, which necessitates downward traction on the auricle to allow inspection of the membrana, and causes the illusion that the membrane lies horizontally. At birth half the meatus is membranous and the other half cartilaginous.

The Eustachian tube is narrower and much shorter in the infant. It measures about 20*m* and in the adult about 40*m* from the anterior border of the sulcus tympanicus. Its lumen at the isthmus is about half that of the adult, measuring about 2*m* against 4*m* in the adult. Unlike the adult, it lies in a horizontal plane. But its angle with the median plane is about 45° forwards and outwards as in the adult. It assumes the adult position at puberty. The relative position of the pharyngeal orifice in relation to the posterior

pharyngeal wall and velum palati is farther forward and slightly lower down. The fossa of Rosenmüller does not form a deep depression till later in life.

The tympanic air cavity does not exist at birth, the osseous cavity being filled with myxomatous tissue and cellular detritus. It is not formed till several days later after the air enters through the Eustachian tube. Still later the air takes the place of the myxomatous contents of the mastoid antrum. The mucosa lining the tympanic cavity and antrum has a very thick submucous layer, and a very uneven surface in the tympanum proper. The thickness of the submucous lining and the reduplication of the membrane reduce the size of the tympanic cavity and mastoid antrum considerably. In general the tympanic cavity and mastoid antrum of the infant contain much more mucous membrane and bony trabeculæ than in later life. The contents of the tympanum proper are fully developed at birth. The change age brings is a reduction in the mucous membrane and bony trabeculæ, making the walls smoother. The drum membrane is the same size as in the adult. #

It is worthy of note that the lymphatics of the infant show a more important difference in comparison with those of the adult than any of the other structures. It is peculiarly significant that the infantile lymphatics are nine times more permeable than in the adult. The length of the lymphatics from the ear to the mediastinum in the infant is about one-ninth of that in the adult—2.5cm to 16cm. Dr. Churchill Carmalt has shown in some unpublished investigations that the calibre of the lymphatics is as large in the infant as in the adult. These dimensions allow nine times readier transmission of bacteria to the mediastinum than in the adult.

I take pleasure in introducing Dr. Carmalt, who has some instructive specimens.

THE PATHOLOGY OF THE INFANT'S EAR UNDERLYING AURAL AND GENERAL DISEASE.¹

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THE theory of pathologic processes in aural disease has assumed an entirely new phase through the bacteriologic investigations of recent years.

In a certain cyclopædia of children's diseases, published little more than ten years ago, under the heading of "Ear Diseases" the word micro-organism does not once appear, while under the head of "Necrosis" the information is afforded that "we now know that brain abscess is the cause and not the result of aural necrosis."

From the anatomical facts presented, you must have been struck with the apparent extraordinary vulnerability of the infant's temporal bone. Indeed considering the vascular structure, its elaborate communicating network of blood- and lymph-vessels and the numerous dehiscences, foramina, and fissures through which they pass, the wonder is that cerebral involvement and general pyæmia do not more often occur.

Under ordinary conditions, pyogenic micro-organisms from food and inspired air may invade the cavities of the temporal bone without special disturbance. But in the presence of lowered vitality from disease or active inflammatory irri-

¹ Read at meeting of the New York Academy of Medicine under the auspices of the Section on Otology, December, 1904.

tation, conditions favorable for the development of these pyogenic organisms and the elaboration of their toxins are brought about.

Thus in young children, according to Politzer, middle-ear inflammatory exudations are found in broncho-pneumonia, bronchitis, intestinal catarrhs, and the acute and chronic infectious diseases.

Inflammation of hypertrophied faucial tonsils and of the lymphoid tissue in the vault of the pharynx is a common cause of extension by way of the Eustachian tube to the tympanum. This process is characterized by swelling of the lining with closure of the tube, acute vascular engorgement of the lining of the tympanum, cell exudation, and eventually active leucocyte migration. Meantime the process has similarly involved the tympanic membrane.

As this process in the tympanic membrane increases in severity, the outer and inner epithelial layers become exfoliated, and the lamina propria or connective-tissue layer, weakened by exudation and purulent infiltration, finally yields to the tension and perforation occurs.

This tension may be so great as to cause convulsions, or, by reason of its incomplete osseous protection in the tympanic cavity, paralysis of the facial nerve.

This is the so-called fulminating type seen in vigorous infants.

As in the young infant the tympanum and rudimentary mastoid antrum are already filled with myxomatous embryonal tissue, such a process described above may be a more elaborate one than is ordinarily imagined.

When no sufficient outlet has not been provided by spontaneous puncture or paracentesis, the purulent secretion in the tympanum must seek other methods of escape.

Owing to the influence of gravitation, to the fact that the young periosteum at this time is readily dissected up from its underlying bone, and to the numerous unclosed fissures, sutures, and foramina, the direction of least resistance is, fortunately, outward in the great majority of cases, much depending, of course, on the severity of the process and the resistance of the individual.

This escape may be had upward and outward through the Rivinian fissure in the antral roof and backward between bone and periosteum, to form an abscess immediately behind and above the ear.

Pus may escape through the cartilaginous fissures in the posterior wall of the external canal, and involve posterior auricular glands in the formation of abscess immediately over the mastoid antrum, displacing the auricle outward and forward in characteristic fashion.

Simultaneously with this process the mastoid antrum has become involved, although on opening through the post-aural abscess no perforation of the cortex and no evidence of bone disease are found.

Again the purulent exudate may escape through the imperfectly closed roofs of the antrum and tympanum, or along communicating lymph- and blood-vessels directly to the middle cranial fossa, setting up meningitis, epidural or subdural abscess, or, involving the brain tissue itself, set up abscess or abscesses in the neighboring temporo-sphenoidal lobe. Such abscesses may exist without any apparent connecting sinus, and even with apparently healthy brain tissue separating it from the tympanic and antral roof.

Further, infection may occur by extension through the imperfect floor of the tympanum, or along the walls of communicating blood- and lymph-vessels, setting up thrombosis in the jugular sinus, with the bulb of which the tympanum floor is in immediate communication.

Again, according to Macewen, extension may occur to the meninges directly through the internal labyrinth wall and its structures, which at this time are insufficiently protected by ossification.

Where the mastoid antrum is present, but no cells yet developed, Macewen says that thrombotic involvement of the sigmoid sinus is rare, on account of the outlet provided by the open sutures and because the sinus is yet a flat affair and its bony gutter not yet hollowed out.

In older children, however, there may be extension from the antrum into the neighboring young cells, resulting eventually, through carious softening or through the medium of

intercommunicating structures, in thrombosis of the underlying sinus.

In similar way, the infective process may extend by way of the posterior surface of the pyramid to the cerebellum, setting up meningitis and abscess there.

One must bear constantly in mind the various possibilities in the course of purulent otitis. So subtle is the method of extension of infective micro-organisms, especially along the sheaths of nerves and the walls of lymph- and blood-vessels, that one might say there is scarcely a single intracranial infection of otitic origin which may not occur without rupture of the drum membrane and without apparent lesion of the internal protecting structures of the skull. In a recent communication on this subject, Eagleton refers to two fatal cases of brain abscess in young infants in which ear disease was not even suspected. *H*

In the consideration of general disease with which severe otitis is frequently associated, scarlet-fever easily leads.

Holt affirms that as a cause of permanent deafness and deafmutism, no disease of childhood compares in importance with scarlet-fever. He quotes the statistics of May, who, in 5613 cases of deafmutism, found that 572 were caused by scarlatinal otitis.

In this disease the progress of the otitis may be characterized by the most severe and rapid inflammatory processes, ending not only in the destruction of the contents of the tympanic cavity, but in involvement of the internal ear and cerebral structures directly through the labyrinthine wall, and even in complete necrosis and exfoliation of the labyrinthine capsule itself—the panotitis of Politzer.

Cerebro-spinal meningitis is considered next important in the relation. Whereas scarlet-fever destroys the internal ear from without, this disease invades from within the brain, the specific infecting micro-organism passing from the neighboring meninges and invading the aqueduct of the cochlea and the vestibule, thus affecting both hearing and equilibrial branches of the auditory nerve as well as its trunk and nuclei. Hence the staggering gait and hopeless deafness of those who recover.

The other diseases—measles, diphtheria, influenza, and some more important ones—I am obliged through lack of time to pass over.

In connection with gastro-intestinal disease, in which the so-called latent type of otitis is found in contradistinction to the fulminating type, already described, the studies by Dr. Preysing of Leipsic of the temporal bones of 100 infants two years old and under are of interest.

Of this number, 44 died of gastro-intestinal disease, and of the 200 tympanic cavities examined an exudate was found in 153—33 of which proved to be sterile.

Of these 153 temporals, tympanic membrane perforation was found only 9 times, several of which were artificially produced.

This form of otitis has been described by Heermann as otitis concomitans of infancy, and he assigns its cause to the general weakness of disturbed nutrition.

If, as Politzer insists, both of these types may have the same complications, the infant may be seriously threatened by his latent otitis.

In the respiratory tract the most frequently associated disease is broncho-pneumonia.

If, as according to statistics, one-third of all deaths reported occur in the first two years of infancy when so many die of broncho-pneumonia, any relation between this disease and otitis must challenge our attention. The association of cerebral complications with broncho-pneumonia appears in most statistic tables. In a series quoted by Holt of 100 autopsies on infants under three years, there appear two cases of meningitis and one of cerebral abscess.

In 67 of these 100 the pneumococcus in pure culture was found present.

To return now to the remarkable study of Preysing's 100 autopsies, we find the astonishing statement that out of 121 infected tympanic cavities 112, or 92½ per cent., contained the pneumococcus in mixed infection, while in 96 this germ appeared in pure culture.

It is interesting to note that 60 per cent. of all cases of lepto-meningitis, according to Stengel, are caused by the

pneumococcus, and lumbar puncture in otitic cases is giving pure cultures of the germ with increasing frequency.

Preysing, in his conclusions, does not accept the theory of the extension of disease by way of the tube, but rather that a toxæmia occurs directly from the imprisoned exudate. Nor does he claim that otitis is a primary disease. He considers the "interdepending causes so multiform that he must limit himself to that portion based upon his bacteriologic findings." He finds in his studies that "otitis owes its origin to the same cause as that of most pneumonia cases," and considers the two diseases closely related to a third—*infection of the pharynx and naso-pharynx by germ-laden air*.

In conclusion, then, it would seem, cold being given as a frequent cause of apparently primary broncho-pneumonia, that fresh air may be at once the life and death of the infant, and that the weakling who, in addition to being fed on sterilized food, is carried through the first two years of his life in an atmosphere of sterilized air, would be likely to evade some of his most subtle and formidable enemies, the pneumococci, and get a firmer grip on existence than that which under the present order of things he is able to obtain.

OTITIS MEDIA IN CHILDREN.¹

By A. JACOBI, M.D., LL.D.

DR. G. HEERMANN published in 1898 a small book on "Otitis Media in Infancy (Otitis Concomitans)." For a part of the critical history of that affection I refer you to him. When I looked over the shelves of our library which are filled with books and pamphlets written on the ear, and glanced over the literature contained in the subject catalogue of the Surgeon-General's Library, I was glad to remember that I must not take more than fifteen minutes of your time. This, then, is not an historical paper.

Otitis media is of frequent occurrence in the very young. It may combine with the retrograde involution of the embryonal myxomatous tissue, which may disappear soon after birth but persists often in the antrum and tympanic cavity and undergoes purulent softening. Otitis media may exhibit mild and grave symptoms, like every form of inflammation in other organs. For instance, the localized mild croupous or lobular pneumonia, and one that migrates or terminates in induration or in atelectasis or abscess, is still called a pneumonia and nothing else. Otitis may be either a mere surface affection of the mucous membrane, or one complicated or not with thrombosis, or suppuration, or caries, or facial paralysis, or meningeal or other complications, and is still denominated an otitis. It may be either primary or secondary to a naso-pharyngeal disease, or cause or be caused by, or appear contemporaneously with, pneumonia, meningitis, or enteritis;—it is still an otitis. That is why I decline to sub-

¹ Read at meeting of the New York Academy of Medicine under auspices of Section on Otology, December, 1904.

divide otitis as Heermann has done—into a bona-fide otitis and a concomitant otitis, the latter name being given to those forms which are observed in atrophic or emaciated infants, whose general illness however shows no actual differences in the symptoms or even in the course of their local disease, or in their bacteriology. What we have to remember is the fact that the same symptoms and extent of local changes do not belong to all cases equally, and that the same therapy is not adapted to every case.

Purulent otitis is frequently found in autopsies. Preysing found in those made on 100 infants that died of a variety of diseases, 81 affected with otitis media. Only 8 were unilateral, so that there were 154 diseased ears among 100 dead infants. Nor are older children exempt. Geppert found a latent otitis media in 75% of all the inmates of the children's hospitals he examined. These are the same results which are obtained by previous and succeeding observers of the same disease when occurring at different ages. School-children have been examined in that direction a great many times, but I give only two instances which, so far as I know, have not been copied in our journals. Dillner found among 38 children that had to be excluded from their schools on account of incompetence 9 still suffering from inflammatory ear diseases; Kalischer, among 255 children excluded because they made no progress and hindered their classmates, 80 with previous or still persistent middle-ear inflammations.

Pyogenous microbes enter the middle ear mainly from the naso-pharynx, which according to R. O. Neumann¹ contains even in its normal condition a large number of microbes, mainly micrococcus pyogenes albus in from 86 to 90 % and the bacillus pseudo-diphtheriæ in 98 % of all cases. In nasal catarrh there is a relative increase of the bacillus pneumoniæ of Fraenkel and Friedlander, of streptococcus pyogenes, and of the bacillus of diphtheria. These latter may cause nasal catarrh, while the bacillus pseudo-diphtheriæ is a saprophyte only. Thus my frequent statement that

¹ *Zeitschr. f. Hyg. und Inf. Krkh.*, 1902, vol. 40.

many cases of nasal catarrh during an epidemic of diphtheria were diphtheritic—first based on clinical observations published in the *American Medical Times*, of August, 1860,—is confirmed by the most recent bacteriologic research.¹

|| Microbes get into the middle ear in the contiguity of the surface of the mucous membrane progressively, not necessarily in every case of diphtheria, scarlatina, or other eruptive disease, but still frequently; or they are thrown in during coughing, vomiting, or sneezing. That is mainly so when the nares are obstructed by catarrhal swelling, or by the presence of mucus or of a membrane, or by a high degree of congenital deviation. Nurslings are in danger during suckling and deglutition—the more so the lower their vitality and the more fragile their epithelia, the feebler their circulation and the greater their emaciation. It is in these conditions that microbes, mainly cocci, which are ubiquitous in the accessible cavities, will enter the tube with great facility and meet those which are previously inhabiting it, and which become very effective by the circumstance that under the influence of ill nutrition, atrophy, and colds the vibrating epithelia become paralyzed. This latter condition is easily produced, on account of the normally slow air current in the Eustachian tubes and in the middle ear.² A very direct cause of otitis media is found in the presence of naso-pharyngeal diphtheria or straightforward “nasal” diphtheria, which in its mild or grave form is by no means so uncommon as a very modern author seems to believe, who thinks it worth while to publish, in three long articles, three new cases of primary nasal diphtheria. It is true that in this paper there is a display of such erudition as is apt to be exhibited in quotations. The author’s literature goes back to antiquity, and that antiquity to 1900, aye to 1890. I admit that is uncommon research in our over-productive journal literature. But there is still more ancient literature on the subject.³ In nasal and naso-pharyngeal diphtheria, otitis media is quite frequent, perhaps, however, not quite

¹ *Therapeutics of Infancy and Childhood*, 3d edition, p. 407.

² The contributions to diphtheria, published in the *Journal of Obstetrics*, February, 1875; the article on “Diphtheria,” in the second volume of Gerhard’s *Handbook*, 1877; and the *Treatise on Diphtheria*, published by Wm. Wood &

so frequent as we might expect if we overlooked the cases in which the membrane is solid and firmly closes the orifice of the Eustachian tube. It is mostly observed in those cases of nasal diphtheria in which the membranous deposits are very light and flocculent and the secretion copious and acrid. It is principally this class of cases in which the nasal injections or irrigations introduced by me more than forty years ago prove life-saving, and, as to ears, preventive.

In diphtheria of the throat, a slight swelling of the mucous membrane or, as I have said, a moderate diphtheritic deposit may close the Eustachian tubes, and hard-hearing may be the result. In this class of cases the patient complains not infrequently of intense pain behind the angle of the jaw and in the ear, and in some cases the diphtheritic membrane is continued into the tubes, and gives rise to otitis interna and media, which finally terminates in perforation of the drum membrane, and occasionally in caries of the bones. Wreder¹ collected 18 cases of diphtheria of the middle ear in scarlatina, complicated with the same affection of the fauces and nares. One child with diphtheria of the mouth and pharynx had also diphtheria of the inner ear. Kuepper saw diphtheria of the middle ear and Eustachian tube, and Wendt once in the tubes, and, amongst 84 cases of variola, twice in the middle ear, together with the same affection in the naso-pharyngeal cavity.²

A frequent cause of otitis media is scarlet-fever, with its coccic or bacillary throat affection. In mild or severe cases there may be perforation of the drum membrane, necrosis of the drum membrane and of bones, progress of that process to the antrum and the cells of the mastoid processes and to the sinuses and meninges, with the results of pyæmia, brain abscess, or septicæmia. In some of these cases of scarlatinal otitis media there may be, without many apparent local symptoms, fever, delirium, diarrhoea, or bronchitis. Many such cases while yielding no pain from pressure on the mas-

Co., 1880; even the several editions of the *Therapeutics of Infancy and Childhood*—all of which references are in our own library—contain what would have facilitated modern re-discoveries.

¹ *Monatschr. f. Ohrenh.*, x., 1868.

² Quoted from my *Treatise on Diphtheria*, 1880.

toid process exhibit fever, not always with a steep pyæmic curve, and merely a swelled lymph node on the mastoid process. In that condition it is safer to take these seemingly mild cases seriously, and to operate. Pus may be, and frequently is, inside the bone.

In measles, influenza, typhoid fever, and variola otitis media is not quite so frequent as in scarlatina. Otherwise, all the varieties of nasal, pharyngeal, and naso-pharyngeal catarrh, also adenoid vegetations and hypertrophied tonsils, are known to be frequent causes or accompaniments of ear disease. The influence of hypertrophied tonsils is perhaps exaggerated in the estimation of many of us in this, that when *uncomplicated* they do not easily cause otitis; but it is true that there are but a few cases in which they stand alone, by themselves. They are almost always complicated with catarrh in the neighborhood, and with accumulations of mucus which cannot be readily dislodged and undergo disintegration.† To that fact Yeardsley drew attention seventy years ago. Altogether, to my certain conviction, the rôle of the tonsils in other conditions is also over-estimated. I may be permitted to mention here, as I have done many times before, that their influence in admitting cocci, bacilli, and toxins as a cause of scarlatina, diphtheria, tuberculosis, and rheumatism is inferior to the absorbing power of the numerous surrounding lymph bodies, for these latter are in a much more intimate connection with the lymph circulation than the tonsils which are surrounded by a firm capsule. Some of the causes which carry noxious material into the tube I have mentioned. I emphasize again the influence of coughing—mainly in whooping-cough, but also in pneumonia—of vomiting, and of sneezing, also possibly of medicinal and other injections into the nares; of a transfer by the fingers of enteritic material, particularly when the Eustachian tube is made more accessible by a bifid uvula, or when the soft or hard palate is fissured, or in the presence of impeding adenoids; for then the levatores palati muscles have no support and the muscles of the tubes are insufficient and atrophied.

† Primary tuberculosis of the middle ear is rare. It may be

the result of bacilli entering from outside through the perforated drum membrane, or through the Eustachian tube during coughing or sneezing. Secondly, it depends on invasion through the Eustachian tube in cases of pharyngeal, laryngeal, or pulmonary tuberculosis, or through the circulation. This happens mostly during the glandular and bone tuberculosis of the young, and in miliary tuberculosis. Altogether the reports differ in regard to the frequency of tuberculous otitis media. Bezold found only 127 cases amongst 17,087 ear patients. Amongst the chronic abscesses of the middle ear 4.4 % are tuberculous. Few of them occur in infants and children, that is only 5.5 % of the whole number, while the remaining 94.5 % belong to advanced age (Habermann). Abscesses of the internal ear though they be in tuberculous children need not result from or contain tubercle bacilli, though according to one statistical report 9 % of all the abscesses were said to have been found in tuberculous children, and a few of them had miliary tuberculosis. The otitis media depended in almost every case on pneumococci.

In cerebro-spinal meningitis the ear is often affected, more it appears in some epidemics like that of this year (1894) than in others. I never saw a case of deafness and consecutive deafmutism originating in cerebro-spinal meningitis that recovered. Whether preventive measures may reduce this untoward experience remains to be seen. For nasal affections are frequent. In almost every case of mine, observed this year, there was catarrh; in all that were examined for it, diplococci meningo-intercellulares were found in large numbers. This nasal affection may and does lead to otitis media. The labyrinth deafness occurring during the height of the disease has thus far proved very unfavorable. - /

Inflammations of the inner ear are rare, only two in Preysing's 197 cases. Perhaps the majority depend on cerebro-spinal meningitis. In one of these cases the transmission was not even direct, for the first result of the otitis media was a purulent meningitis, in the course of which the inner ear of the opposite side became diseased. Ménière's symptoms, namely, disturbance of the equilibrium, nausea, and

vomiting, are not often observed. They will always get worse after quinine or salicylic acid.

The contents of the middle ear may be visible through the drum membrane or not; the latter may bulge or not. That is why in very many cases otitis media may not be accessible to a diagnosis, and perforation of the drum membrane is not so common as might be expected. It happened in only nine of Preysing's 154 diseased ears. This infrequency of perforation is believed to be due to several reasons.

1. The greater resistance of the drum membrane in the young, the external cutis layer being often thicker than in the adult, the median connective-tissue membrane very solid, and the inner mucous membrane with its pavement epithelium at least as normal as in advanced age.

2. In the young the Eustachian tube is short but wider, both at the isthmus and at the tympanic orifice, and the direction of the canal almost horizontal. In the foetus the opening of the tube is below the level of the hard palate; at birth it reaches that level; in a child four years old it is about 3 mm above it.¹ That is why Preysing denies the easy exit of the pus into the pharynx. He claims, what is true, that the pus is mostly thick, and that pus would rather, while the baby is on its back, run into the mastoid antrum than through the tube. But the recumbent position is not always kept up, so long as the baby is not yet on the autopsy table. Bedside and nursery observers will appreciate this, and pathologists might.

It should be remembered that most of the figures quoted are taken from poorly developed, emaciated, even atrophic hospital cases. Now atrophy affects the mucous membrane of the Eustachian tube as well as the rest of the body and adds to the width of the tube, which is thus wider in this class of patients than in the healthy and well-nourished. In this latter, perforation of the drum membrane is not so very rare, though indeed many a case of otitis media in this very class of patients, after fever, sensitiveness on pressure, and meningeal symptoms have been distinctly noticed, will

¹ T. Mark Hovell, 2d edition, 1901.

run a mild course without perforation. Whatever pus does not find its way into the pharynx—no perforation having occurred—is, or may be, absorbed, while the inner mucous membrane, including that which covers the drum membrane, will become thickened and give rise to hard-hearing or even deafmutism. Still there is another possibility, and indeed one of frequent occurrence. The copious net of lymph vessels in the young is always very active, in the emaciate and atrophic very greedy, and the absence (caused by the disease) of the pavement epithelium of the drum membrane and of the cylindrical and vibrating of the interior permits more rapid absorption. This condition is a sufficient explanation of the readiness with which absorption may take place from the interior of the ear into the lymph and blood circulation, and lead to deposits in distant organs, to mild or serious sepsis, to persistent exhibitions of temperature with no tangible cause, to death, or to slow recovery. Moreover, Preysing found on the inflamed surface, as the result of copious leucocyte migration, granulation globules with minute blood-vessels, without epithelia, resembling in shape small tubercles, and surrounded by slight hemorrhages and a narrow ring of beginning organization. These little granulomata, with their small blood-vessels, may also favor absorption.

The pneumococcus which is found in otitis is rather ubiquitous. As we find it in pneumonia, meningitis, pericarditis, peritonitis, and so on, we need not be surprised at meeting it in connection with the otitis of the young, with a pneumonia, or with an enteritis, and their results. Pædatrophy and otitis have been known to combine, more than half a century. I was taught their clinical contemporaneousness when a younger student of medicine than I am to-day, fifty-five years ago. Which of these complications,—otitis, pneumonia, enteritis, or meningitis,—is the primary one is difficult to say in most cases. To my mind, none of them is, in many a case, the primary cause of the general infection. Pneumococcus, being present on every healthy mucous membrane, will enter the circulation from any point, particularly from the nose, on which, by accident or disease, the

epithelial cover is removed or on which it is disintegrated. Thus a meningitis may be the first symptom of a general pneumococcus invasion. It may be followed by other localizations or by general sepsis. Persistent diarrhœa, often fatal, is frequently observed in such cases. Homen and Laitinen, quoted by Preysing from *Ziegler's Beitr.*, vol. xxv., caused hemorrhages on serous membranes and diarrhœas, by injecting only the toxins of streptococci.

Meningitis connected with otitis media need not be purulent. Dr. Francis Huber published a case of otitic serous meningitis which recovered permanently.¹ The patient was a child of two and a half years, suffering from adenoids and chronic aural discharge. There were general convulsions which returned frequently during the ten days preceding admission. There was semi-consciousness, the pupils were dilated, mainly the right; there was convergent strabismus and lateral nystagmus, rapid pulse, and taches. The tendon jerks were exaggerated. On the thirteenth day the mastoid process was opened, diseased bone removed, and the dura reached but not opened. Lumbar puncture was then made twice in two days, 30ccm and 16ccm of liquor were removed. It contained no bacteria. Twenty-two days afterward the child was discharged and remained well.

In the atrophic infants the bone, with the exception of some parietal swelling, was not found to be affected. Even in healthy children the bony wall of the antrum is very thin, and small abscesses are apt to perforate before giving rise to serious injury.

PREVENTION.

Nasal, post-nasal, and pharyngeal catarrh should be treated before they can do harm; adenoids removed, enlarged tonsils resected, and hypertrophy of the mucous membrane of the nose attended to. No operation about these parts is successful unless subsequent cleanliness be enforced. I have found that some operators neglect to avoid recurrences by not attending to that rule. One or two daily warm saline irrigations made *from a nasal cup*, during which

¹ *Am. Med.*, 1903.

the mouth should be kept slightly open—*not injections*—suffice for that purpose. Adenoids when small will get well without operation when these irrigations are gently and regularly made. Sprays or the use of droppers cannot take the place of irrigations. A spray of a .5 per-cent. solution of silver nitrate through the nares once a week will work well. This application should be made several weeks in succession.

TREATMENT.

A child with an acute otitis media should be in bed, the head and trunk raised. The raising of the head alone may lead to annoyance of the circulation of the neck. No feather pillows under the head. Symptoms will be ameliorated by a mild antipyretic, a narcotic, a purgative. Politzer and Valsalva are not adapted to the acute stage. Severe pain may be relieved by a few drops of cocaine solution instilled into the ear, occasionally by a leech on the mastoid process. Warm fomentations with spongiopiline, or simple warm wet cloths without or with antiseptic solutions should be tried. When pus forms the posterior half of the membrane bulges first; at its edge the hammer is distinguished. When an incision is required it should be made posteriorly and inferiorly. The expulsion of the pus through the incised wound can be facilitated by Politzeration, but this procedure may drive pus into the cells. Injections into the external canal should—if at all, be made toward the wall of the canal. Their advisability is favored and denied in equally strong terms. I do not use them. More than a dozen years ago I learned from my specialist friends the use of boric acid. After the ear has been wiped out with absorbent cotton it is filled loosely with boric acid. When this is softened with pus, the ear is again cleansed and the process repeated. This procedure has proved so successful that I remain true to the advice of my friends. I have often been told since that the method is bad and that injections into the external canal should be preferred, but I have read of deaths that have occurred after injections in the practice of such men as Troeltsch, Fraenkel, and Katz, and I cannot

help appreciating the fact that enough people die without our aggressive co-operation. ¹¹

To what extent sepsis depending on otitis media, pure or complicated, can be benefited, is uncertain. Anti-streptococcus serum is of very doubtful efficacy. Credé ointment may be used with a certain amount of confidence. It should be applied once or twice a day. The inunction should last half an hour, and absorption facilitated by the addition of a few drops of water to the ointment. Collargol acts more rapidly when dissolved in sterile water and injected into the rectum. Large quantities of water, drunk, injected into the rectum, or under the skin in the usual cautious way, are known to cause copious elimination from the blood, and deserve all the praise which has again been bestowed upon them by B. Alexander Randall in an article on "The Treatment of Otitic Septicæmia," which appeared in the *Journal of the American Medical Association* of November 26, 1904. Nuclein may be tried internally.

A. Bronner, of Bradford, England,¹ publishes his opinion on the local treatment of some forms of non-suppurative catarrh of the middle ear by compressed air and a nebulizer, recommending for the purpose the compressed-air apparatuses used in America. He is careful enough to add what he takes to be a fact that many cases of so-called dry catarrh of the middle ear are not due to any affection of the mucous membrane at all, but to a primary disease of the osseous labyrinth. In these cases the use of the catheter can do a great deal of harm. If sudden great pressure be applied, the hearing and tinnitus may become worse. In dubious cases he uses the catheter with an iodine spray under very low pressure. It seems probable that in many of these cases we have after all to deal with the results of former inflammations that resulted in thickening of the mucous membrane. It is in these cases, though they be not syphilitic, that the internal use of an iodid or of "mixed treatment" may be expected to do good. But as a rule, and that I emphasize more than anything else, chronic disease of the mucous membrane of the ear will never get permanently

¹ *British Med. Journal*, November 5, 1904.

cured unless the chronic catarrh of the naso-pharynx receive constant attention. After all, the treatment of non-suppurative disease of the middle ear is rather ineffective. Nothing is more corroborative of this old experience than the discussion lately held in the *British Medical Association* by eighteen gentlemen, well-known in their specialty and literature, a few of them our own fellow-countrymen.¹ The latest paper on "The Present Status of the Treatment for Deafness Due to Chronic Catarrhal Otitis Media," published by Dr. Philip D. Kerrison in the *Journal of the American Medical Association*, November 12, 1904, expresses itself in the same strain.

¹ *British Medical Journal*, November 5, 1904.

THE OPERATIVE TREATMENT OF DISEASES OF THE EAR IN CHILDHOOD.¹

By EDWARD BRADFORD DENCH, M.D.

THE operative treatment of aural disease in childhood does not differ materially from the treatment of similar conditions in older patients.

For convenience, in consideration of the subject in the short time allotted to me, I have divided my remarks as follows:

The operative treatment of acute otitis media.

The operative treatment of the complications of acute otitis media.

The operative treatment of chronic non-suppurative middle-ear inflammation, and

The operative treatment of chronic purulent middle-ear inflammation.

Under the first head—the treatment of acute otitis—in considering acute otitis in childhood, I shall not attempt to separate in this paper the acute catarrhal form from the acute purulent form. We may divide the treatment of acute otitis into, first, the treatment during the attack, and, second, the interval treatment. Whenever, in childhood, we find a patient suffering from an acute inflammation of the middle ear, giving rise to a persistent increase in temperature, operative treatment is imperatively demanded. In only one way can the surgeon relieve the local condition, and save the patient either from a serious menace to his life or serious danger of permanent impairment of the function

¹ Read at meeting of New York Academy of Medicine, under auspices of Section on Otology, December, 1904.

of audition. Early and free myringotomy, in all cases of acute otitis in childhood, is urgently called for. The younger the patient, the earlier should this simple operation be performed.

As to the method of incising the drum membrane, perhaps a few words may not be out of place. Excepting in very young infants, I believe that the operation should always be performed under general anæsthesia. In young children, chloroform is probably the best anæsthetic, while in older children, nitrous oxide gas is the ideal drug to use.

The incision in the drum membrane should be exceedingly free. It should extend from the lower pole of the *membrana tympani* upward and backward, following the posterior peripheral attachment through the posterior fold, and well upward into the tympanic vault. Where there is any sinking of the upper and posterior canal wall, the incision should be carried well outward on to the superior wall of the bony meatus. In this way, free drainage, not only of the *atrium tympani* but also of the tympanic vault, is secured; while the incision on the upper wall of the canal, by dividing the periosteum over the floor of the antrum, tends to relieve the congestion in this region, and to favor the resolution of the inflammatory process which is spreading in this direction. In addition to this long posterior incision extending on the canal wall, as above stated, I frequently make a horizontal incision, at right angles to this, backward from the short process of the malleus, the blade of the knife being introduced flat-wise, just above and behind the short process, and being carried upward, backward, and inward into the tympanic vault and made to cut its way backward until it joins the vertical incision already mentioned. This secures very free drainage, and I am confident, when performed early, in many cases prevents the extension of the disease to the mastoid.

In very young infants it may be argued that general anæsthesia is not necessary. I can only say, with increasing experience, that I am more inclined to anæsthetize each patient, in order that the operation may be carefully and properly performed. It goes without saying that proper

aseptic precautions must be taken in performing this operation. The external auditory canal is sterilized, previous to operation, by mopping it out with an alcoholic solution of bichloride of mercury, of a strength of 1 : 3000. All instruments used are sterilized, either by boiling or by exposure to formalin gas.

By exercising care, in regard to these details, the best results are obtained.

This, I think, covers the treatment of acute otitis. Better occasionally that the surgeon should err by doing a myringotomy on a case where resolution might take place, than that he should wait too long, in a single instance, allowing the disease to extend to the deeper parts. A myringotomy properly done will do absolutely no damage. Delay this simple procedure for twenty-four hours, and no one can tell how much injury may result to the patient.

In speaking of acute otitis, I mentioned what I called the *interval treatment* of acute otitis. We are frequently asked to examine children where the following history is given : The child has suffered from repeated attacks of earache, but not intense enough to require the attention of the otologist. The patient has, perhaps, been restless for a few nights and, if old enough, has complained of pain in the ear. There has been some slight increase in body temperature with each attack, but the symptoms have disappeared at the end of a few days, sometimes accompanied by a slight aural discharge, but more frequently no discharge has been present. It is in just these cases that the best results can be obtained. What we must strive to do is to prevent a recurrence of these attacks. An examination of these patients almost invariably reveals the presence of adenoid vegetations within the pharyngeal vault, together, in many instances, with enlarged faucial tonsils. The otologist does not do his duty unless he insists, in these cases, that the lymphatic tissue in the fauces and pharyngeal vault be thoroughly removed. In other words, complete tonsillotomy and adenotomy should always be performed in children who present with the preceding history. Not only may a serious acute inflammation be averted, but, what is, perhaps, quite as important, these

slight recurrent attacks may be absolutely stopped, thus preventing the development of a chronic catarrhal inflammation within the middle ear. There can be no question that many of the serious chronic catarrhal inflammations of the middle ear, seen in adult life, are the result of neglected acute catarrhal inflammations in childhood.

Turning now, to the complications of acute middle-ear inflammation,—these are :

1. Extension of the inflammatory process to the mastoid.
2. Extension to the lateral sinus or jugular bulb, causing a sinus thrombosis.
3. The extension to the meninges, causing either a localized meningitis or epidural abscess, or a diffuse meningitis, either serous or purulent ; or
4. Extension to the brain substance itself, with the production of a brain abscess, either cerebral or cerebellar.

I purposely consider these conditions as complications of acute middle-ear inflammation because, in the majority of cases, the symptoms are urgent, and constitute practically an acute condition. We must always remember that whenever we have a chronic suppurative inflammation within the middle ear, that an acute condition may be grafted upon this chronic process, giving rise to sudden and alarming symptoms. It is the experience of all who have to deal with ear cases, that the most severe intracranial complications usually follow an acute exacerbation of a chronic purulent inflammation. Under these circumstances, however, the urgency of the symptoms makes the case generally an acute case, and it is the acute inflammation and its sequel with which we have to deal.

I, therefore, take up the consideration of the treatment of these complications of middle-ear inflammation, immediately after the treatment of acute otitis media, although, as before stated, the acute condition may be an exacerbation of the previous chronic process.

The operative treatment of these conditions varies but little from the operative treatment of similar conditions in adult life.

Considering the various lesions, *seriatim*, I would say that

in dealing with mastoid involvement in children, I am inclined to operate at an earlier period in childhood than in adult life. The external auditory canal in the child is relatively much narrower than in the adult, and drainage along this channel is correspondingly less free. Moreover, the mastoid process in early childhood is but poorly developed, and an inflammatory process spreading from the mastoid is much more prone to extend to the cranial contents, particularly to the meninges, than it is in adult life. We know that in early childhood certain dehiscences are not uncommonly found in the tympanic and antral roof, through which processes of the dura extend, and thus infection within the middle ear or mastoid may rapidly spread to the meninges. Early and free drainage, therefore, is of the utmost importance in childhood. As illustrating how poorly the middle ear drains through the external auditory meatus, we have all of us seen many cases of post-aural abscess, without rupture of the *membrana tympani*, the pus merely finding its way through the Rivinian segment and out upon the external surface of the skull before the drum membrane has ruptured.

In *all* cases, then, of middle-ear inflammation in childhood, where free myringotomy does not relieve pain and temperature at the end of a few days, the mastoid should be opened and the typical mastoid operation done, even upon no other indications than pain and temperature, and in young children considerable temperature elevation *alone* is a sufficient indication.

In performing the mastoid operation upon a young child, the surgeon should remember that the superior attachment of the auricle does not mark the location of the antrum. From the fact that in infancy the bony canal is practically wanting, the superior wall of the fibrous canal is applied to the external surface of the squama. It is necessary, therefore, in performing the mastoid operation in a young child, to expose the margins of the tympanic ring and enter the bone just behind the posterior superior tympanic spine in order to be certain of reaching the antrum instead of entering the middle cranial fossa. After the antrum has once

been entered, the entire overlying cortex should be removed. Although no tip cells are present in infants, I always make it a practice to ablate the entire mastoid process. In older children, where the pneumatic spaces are developed in the mastoid, the entire mastoid process must be ablated. All pneumatic cells must be thoroughly opened and cleared out, if we would eradicate every trace of the disease.

In very young subjects, it has been my practice to separate the margins of the mastoid wound considerably by packing at the first dressing immediately after operation, so as to facilitate the subsequent dressings. If this is done, the little patients are spared much unnecessary pain.

Infection of the large venous channels within the cranium may occur, either by direct extension from the middle ear, without secondary involvement of the mastoid process, or may be secondary to mastoid inflammation. While the latter condition is the more common, I have seen cases in which extension to the jugular bulb, with subsequent thrombosis, took place, without any involvement of the mastoid. The surgeon should always look with suspicion, therefore, upon marked intermissions in the temperature of the patient, whether or not there is any evidence of mastoid involvement. A temperature which varies from 99° to 100° at one time in the day, and then suddenly rises to 104° or 105° , only to fall to normal in the course of a few hours, should always lead the surgeon to suspect involvement of the lateral sinus. Naturally, in order to explore the sinus, the complete mastoid operation must first be done, but with these marked intermissions in temperature the mastoid operation alone is not sufficient, and the surgeon should expose the lateral sinus or, in case both ears are involved, both lateral sinuses. Even when the sinus appears perfectly normal to inspection and palpation, I am in favor of incising the sinus wall, and passing the curette downward toward the jugular bulb, in cases where these marked fluctuations in temperature persist.

In a case seen in consultation with Dr. McKernon, and operated upon by him, such radical treatment was the means of saving the patient's life. In exposing the sinus, the

surgeon must remember that it is necessary to expose it from just above the knee to a point as near the bulb as possible. If this is done, it is perfectly simple to shut off the blood current from above by pressure, incise the sinus close to the bulb, and remove any clot which may lie in this region. If a clot is found in the sinus, it should be removed absolutely—that is, until free hemorrhage occurs; hemorrhage from below, showing that the blood channel is open to the jugular, and hemorrhage from above, showing that the vessel is not blocked in the direction of the torcular. If free hemorrhage is not obtained from the lower end of the sinus, the internal jugular must be excised completely, to prevent general systemic infection. While these operations sound formidable, they are really exceedingly simple, can be performed readily, and, if not undertaken too late, will save many a life.

In some cases, infection spreads to the meninges, giving rise either to an epidural abscess or to a general meningitis. An epidural abscess or a localized meningitis is one of the most satisfactory conditions with which the surgeon has to deal. The diagnosis is seldom made before the operation upon the mastoid, and herein lies the importance of a complete and thorough mastoid operation. With a large operative field thoroughly exposed, the removal of all diseased bone will lead the surgeon to the discovery of any collection of pus between the dura and the skull, and its thorough evacuation will be followed by a prompt and complete recovery. In dealing with this condition, the surgeon should remember not to break down the adhesions which limit the abscess. All the bone should be removed to the very line of adhesions. To continue to remove bone, however, until absolutely healthy dura is reached, is a mistake. The adhesions are an effort on the part of Nature to prevent the extension of the inflammatory process, and this fact should never be lost sight of by the surgeon.

Quite different is the outlook where we are confronted with a general or diffuse meningitis, either of the purulent or serous variety. While I have never succeeded in saving a case of acute meningitis in a child, I have reported one case in adult life operated upon successfully. Infection, in

these cases, is sure to take place either through the tympanic or antral roof. If the diagnosis is made extremely early, the cranial cavity opened, and the site of infection packed off from the general cranial cavity by means of iodoform gauze, I believe that the patient may occasionally recover.

Where we suspect a beginning inflammation of the meninges, from a middle-ear process, the operator should expose the dura in the middle cranial fossa by a free incision extending well over the top of the ear to within half an inch of the external angular process of the frontal bone. The middle cranial fossa is then opened immediately above the external auditory meatus, through the thin squamous plate, and the opening enlarged upward and backward until an area of dura, at least an inch and a quarter in diameter, is exposed. The cranial contents are then carefully elevated from the tympanic roof, in order to discover any area of infection. If a perforation of the tympanic roof is discovered, this is packed off by means of iodoform gauze, so as to prevent an extension of the infection to the meninges.

Randall has reported successful results from washing out the subdural space with an antiseptic solution in cases of beginning meningitis. In spite of the most prompt and radical measures at the hands of the surgeon, however, a diffuse suppurative meningitis must, in the majority of cases, prove a fatal complication. In serous meningitis, however, it seems possible that we may look for better results. A number of cases have been reported, in which serous meningitis seems to have been relieved by successive lumbar punctures, thus relieving the intracranial pressure. Lermoyez, at the last International Congress, at Bordeaux, reported two cases successfully treated in this manner.

It goes without saying, that whenever these cases occur in conjunction with an otitis, in addition to the lumbar puncture, the surgeon must completely eradicate the local process by a thorough operation upon the middle ear and mastoid. It is in this connection that early drainage of the lateral ventricles may be of value. I have drained the ventricles of the brain in one instance for an acute serous

meningitis. The patient survived the operation about eight days, and subsequently died of a hemorrhage in the upper part of the spinal cord.

Whether ventricular drainage or lumbar puncture will be the proper procedure in these cases, experience alone will determine. My own plan at present would be to first clear out thoroughly the mastoid cavity, performing, if necessary, a radical operation, so as to eliminate the original focus of disease, at the same time to add a lumbar puncture, thus relieving the increased tension of the cerebro-spinal fluid. If this plan is not followed by improvement, I should then proceed to drain the lateral ventricles, if there was pressure above the tentorium, or drain the fourth ventricle by a deep incision through the cerebellum, if the pressure seemed greater in this region.

The treatment of brain abscesses in childhood is naturally the same as that of a similar condition in adult life. In young children, however, it is much more difficult to recognize the presence of a cerebral abscess, owing to the fact that, on account of the age of the patients, definite localizing symptoms are unobtainable. The diagnosis in these cases must depend upon the subnormal or moderately remittent temperature, choked disc, as recognized by the ophthalmoscope, emaciation, and slow pulse. The most frequent site of an abscess is in the middle cranial fossa, in the temporo-sphenoidal lobe. Next, we most frequently find the purulent collection in the cerebellum. In one case which came under my observation, an abscess was found in the temporo-sphenoidal lobe a few days after the mastoid operation had been performed. The abscess had practically given rise to no symptoms, excepting a high temperature. In spite of free drainage, the child subsequently died.

Whenever a brain abscess is suspected, the surgeon should not hesitate to explore the brain freely. The site of election for this exploration is the middle cranial fossa. The temporo-sphenoidal lobe should be exposed immediately above the external auditory meatus, the opening in the skull being not less than an inch and a half in diameter, and better, two inches and a half. If the dura seems to bulge in any one

locality, an incision should be made here and the brain substance incised by means of the scalpel. If the dura does not bulge over any particular area, I am in the habit of cutting a large dural flap, and reflecting this upward so as to expose the brain substance itself. The knife should then be introduced into the brain substance in various directions: at first, directly inward, then forward and inward, then forward, downward, and inward, and then forward, upward, and inward; next, it should be introduced upward and inward, then downward and inward, following parallel to the upper surface of the petrous portion of the temporal bone. If no pus is discovered in any of these localities, the brain substance should be incised backward, downward and inward, backward and inward, and backward, upward and inward. These incisions should be made with a sharp knife, should be not less than half an inch in length, and should vary from three quarters of an inch to half an inch in depth, according to the age of the patient.

It is never wise to trust to the aspirating needle to discover the presence of pus. The pus in a brain abscess is so thick that often it will not flow through the aspirating needle, and the needle may be plunged directly into an abscess cavity without any pus appearing in the aspirator. Free exploratory incision is the only feasible method of discovering these abscesses.

If exploration of the cerebrum is followed by negative results, the cerebellum should be explored in a similar manner. This latter is probably most easily explored by first exposing the lateral sinus, and then removing sufficient bone behind and below this to lay bare a dural area of sufficient size to allow of the reflection of a dural flap, at least three quarters of an inch in diameter, after which the cerebellar substance may be incised cautiously. It must be remembered that in young children the cerebellum is quite small, and if the knife is introduced for a greater depth than one half or three quarters of an inch, the operator is apt to puncture the fourth ventricle. This may be of service occasionally, in causing free drainage from the ventricles. The point to be borne in mind is that a cerebellar abscess would

scarcely lie more than one half an inch below the surface. Whether the abscess be found in the cerebrum or cerebellum, the cavity should be thoroughly drained, either by means of drainage tubes introduced into the cavity, or by means of a gauze packing. I do not approve of the irrigation of these cavities at the time of operation. Whether or not the finger should be introduced into the cavity, will depend on the choice of the operator. Personally, I am in favor of introducing the finger cautiously into a brain abscess, in order to break down any bands which may divide the cavity, and thus prevent free drainage.

Quite recently, Dr. Whiting, of New York, has devised an instrument known as the *encephaloscope*. This consists of a large metal speculum furnished with an obturator. The instrument is introduced into the brain and the obturator removed. This enables the surgeon to inspect the deeper portions of the abscess cavity, and to wipe out any broken-down brain matter which might otherwise not be removed. The packing of the abscess cavity can also be conducted through the *encephaloscope* in a very satisfactory manner.

After the abscess has been thoroughly evacuated, the cavity may be packed with iodoform gauze or plain gauze, or drainage tubes may be introduced, according to the choice of the operator. Unfortunately, the results obtained in an operation of this kind are, as a rule, unsatisfactory. Most of these abscesses have existed so long before they are discovered, that ventricular infection ultimately takes place, and the patient dies of a diffuse purulent meningitis.

After this cavity has been properly drained, or packed, according to the choice of the operator, the dural flap should be sutured,—a dural opening being allowed to remain only of sufficient size to permit either of the egress of the drainage tubes or of the gauze which is used to pack the abscess cavity. It is also wise to shut off the subdural space as completely as possible, from either the gauze drain or drainage tubes, by packing about the drains with a strip of iodoform gauze. Careful attention to this point will, I believe, save many cases, as quite frequently after a cerebral abscess has been successfully operated upon the patient later suc-

cumbs to a purulent meningitis. I am certain in my own practice that in at least one instance the meningeal infection occurred subsequent to the opening of the abscess.

When we come to speak of the chronic inflammatory processes which may involve the middle ear we have :

1st. Chronic non-suppurative otitis media ; and

2d. Chronic suppurative otitis media.

In young children, naturally, the chronic non-suppurative variety of the disease claims but little attention. The surgical measures to be instituted for the relief of this condition have already been given under the treatment of recurrent acute otitis media. In other words, prevent the child from having successive attacks of acute inflammation within the tympanum, and in later life we shall rarely find a chronic non-suppurative inflammation in this region.

It is true, however, that certain of these cases appear to develop insidiously. It is the duty of every general physician to examine from time to time the nose and nasopharynx of each child under his care, in order to avoid the development of a chronic inflammatory process within the tympanum. I believe that if this plan were followed, and if enlarged tonsils and adenoid vegetations were removed, as a matter of routine in every case, the otologist would see very few cases of chronic non-suppurative otitis media in adults.

I simply speak of the operative treatment of this condition as a prophylactic measure, and cannot impress too strongly upon my hearers the necessity of removing enlarged faucial and pharyngeal tonsils whenever present, in order to protect the patient against the insidious development of a chronic, non-suppurative middle-ear inflammation.

A chronic suppurative inflammation of the middle ear in childhood demands exactly the same treatment as in adult life. In child-life, if the patient is observed before the disease has existed for a considerable period of time, prompt non-operative measures may bring about a cessation of the suppuration.

First among these comes thorough and systematic cleansing of the ears, and irrigation with an antiseptic

solution such as bichloride of mercury. At the same time, the upper air passages must be put in a thoroughly healthy condition, so as to eliminate as far as possible any chronic congestion of the middle ear which may exist. This end is attained by the removal of enlarged tonsils, when present, and by the removal of adenoid vegetations, if these are found. The general hygienic surroundings of the child must also be borne in mind, and frequent colds should be guarded against by the daily use of the cold bath and the wearing of proper underwear.

Failing in these general measures, the suppuration can only be relieved by means of the radical operation. While I hesitate to advise the radical operation in very young children, I have seen exceedingly good results follow it in not a few cases. Where there is any sign of tubercular infection, either as evidenced by the general history of the case, or from an examination of the discharge from the ears, I should most emphatically advise the radical operation. I am not familiar with the statistics of primary tuberculosis affecting the auditory apparatus in children, but I believe that when this portion of the anatomy is affected in childhood, an early eradication of all diseased tissue should be insisted upon to prevent further systemic infection. It must be remembered, in operating upon these young subjects, that the length of time the patient is under the anæsthetic constitutes an element of danger. I much prefer, therefore, in young children to perform the operation in two sittings, namely, at the first sitting, to simply clear out the bone cavity and form a large meatal flap; this part of the operation can be accomplished in from one half to three quarters of an hour, or in an hour at the most. In a week or ten days the child is again anæsthetized, and the bone cavity lined with Thiersch grafts.

While the number of young children upon whom I have operated in this manner is naturally limited, the results have always been very satisfactory. In children of eight to ten years of age, I do not hesitate to do the complete radical operation in one sitting, if the child is in good condition.

A point to be borne in mind, in performing this operation

upon children, is to secure an exceedingly large and patent external auditory meatus. If this is done, the bony cavity becomes dry very quickly, and the dressings are not attended by much pain. If, on the other hand, the meatus is not made very large, the cavity dermatizes slowly, and the dressings are exceedingly painful to the patient, and can only be performed with difficulty.

I would certainly emphasize the necessity of performing these operations upon children more frequently than they are being performed. I believe that if this is done the number of serious intracranial complications occurring in later life will be greatly diminished.

There is one condition which, in closing, I think it may be well to speak of, and that is recurrent mastoiditis. We occasionally find that a child operated upon with apparent success for an acute mastoid inflammation, will appear later with a recurrence of this condition. On questioning, we usually find that the ear has never ceased to discharge. In other words, that, although the mastoid inflammation was successfully dealt with, a purulent otitis remained; later, from some unknown cause, reinfection took place, and we find when the child presents for treatment, either a tumefaction behind the ear, occupying the site of the old scar, or in some cases the old scar is broken down and a fistula has resulted. My experience has been that in these cases the recurrence of the mastoiditis is due to the fact that a purulent focus has been left in the tympanic vault. The only proper treatment for these recurrent cases is the radical operation. A repetition of the simple mastoid operation may relieve the condition temporarily, but recurrence is bound to take place unless the tympanic vault is freely exposed, and the only way to do this thoroughly is by performing a radical operation. As recurrent mastoiditis is more common in children than in adults, it seems to me that a proper method of treating these cases should be fully recognized.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY, REGULAR MEETING OF THE NEW YORK ACADEMY OF MEDICINE, DECEMBER 1, 1904.

DR. A. H. SMITH, PRESIDENT OF THE ACADEMY, IN THE CHAIR.

I. The anatomy of the child's ear, emphasizing points of practical importance. By WM. SOHIER BRYANT, M.D., published in full, p. 80.

The paper was accompanied by a most interesting exhibit of lantern-slides, and in closing Dr. Bryant introduced Dr. Carmalt, who had collected some valuable data concerning the calibre of the infantile lymphatics of the middle ear concerning which there is very little literature from the anatomical standpoint. Dr. Carmalt passed around a number of carefully prepared specimens showing that the lymphatic glands do not grow proportionately to the increasing age, nor do they greatly increase in number, nor is the distribution of these glands proportionately any greater in adults than in children. The size is about the same, except in pathological specimens, where it is greater in adults.

II. The pathology of the infant's ear underlying aural and general disease. By JOSEPH A. KENEFICK, M.D., published in full, p. 84.

III. The inflammations of the ears of children, original or derived from other diseases; the main sources; nasopharyngeal affections, the acute exanthemata, cerebral-spinal meningitis, tuberculosis; their course and medical treatment. By ABRAHAM JACOBI, M.D., published in full, p. 90.

IV. The surgical treatment of diseases of the ear in childhood. By EDWARD B. DENCH, M.D., published in full, p. 102.

Discussion.—Dr. L. EMMETT HOLT said that there were many interesting things remaining to be said on the subject of otitis in regard to etiology and diagnosis, but that he wished now to dwell on some other points. The ground where the general physician and the otologist usually meet is on the decision in regard to operative measures. Regarding the necessity of incising the drum membrane and its being done early there was no need of argument. All who see much of sick children with acute ear disease will agree on the subject of paracentesis. When properly performed there is no danger to the patient, and in case of doubt the operation should be done. The question upon which he desired to speak was with regard to the more serious operations, particularly those upon the mastoid. He thought there was much difference of opinion among both physicians and surgeons as to indications for this operation, his own view being that it was done more frequently at the present time than was necessary or wise. No one appreciated more than he the advantages accruing to patients by the advances made by surgery along this line, but he felt that there is a tendency to carry these proceedings farther than conservative medicine and surgery require. This was particularly the case with regard to operations upon the mastoid in infants and very young children. Dr. Dench had given as a sufficient indication the continuance of high temperature after paracentesis of the drum membrane. He thought this was going too far, and that in infants certainly no operation should be done without very positive indications. The specialist thinks chiefly or solely of the ear, but the general physician must think also of the child. The effect of so serious an operation upon the child's general nutrition was not to be lost sight of. A case seen last season was cited where a mastoid operation had been done upon an infant of five months where otitis had followed influenza. Though in fairly good condition previously, the child ran down steadily from this time. The wound did badly, necrosis followed, secondary operations were necessary, and the child finally succumbed at the end of three months. Such cases were not rare.

One should consider also the immediate dangers to which the child is exposed from the shock and from prolonged anæsthesia when pneumonia may possibly be just beginning, and in such patients he should therefore advise against operation where the only reason for urging it was that no other cause for a continuance

of temperature was apparent. He thought the frequency of mastoiditis as a complication of acute otitis had been exaggerated, as well as the cerebral dangers from mastoid cases not operated upon, particularly in young children. In support of these statements he gave the following statistics from the records of the New York Foundling Hospital for the past five years.

During this period there had occurred in the institution three epidemics of measles with a total of 1034 cases, 166 cases of scarlet-fever, 562 cases of diphtheria, and 88 cases of German measles, not to mention cases of influenza and catarrhal colds which had been very prevalent, but of which no reliable records had been kept. In the five years there had been recorded 551 cases of acute otitis and only 16 cases of mastoiditis. Possibly some cases of mastoiditis had not been recognized. If such errors in diagnosis had been followed by fatal consequences they should be revealed by the post-mortem records, since in this institution nearly all serious acute cases come to autopsy. During the five years 880 autopsies had been made. A search through the records showed the following facts: Cerebral abscess from otitis, no case; purulent meningitis following mastoiditis and sinus thrombosis, 2 cases, neither being operated upon; purulent meningitis from other causes, 12 cases; complicating pneumonia, 8; pericarditis, 2; empyema, 1; diphtheria, 1. Only 2 of 14 cases of meningitis (tubercular and cerebro-spinal cases being of course excluded) were associated with ear diseases.

The Foundling Asylum is not a hospital where sick children are admitted, but an institution of which the children were inmates when taken sick. In such institutions surely the frequency of otitis and the severity of its complications should be greater than is seen in private practice.

Of the 16 cases of mastoiditis recognized in the period of five years, 6 recovered without operation, and 10 were operated upon with 6 recoveries and 4 deaths, all of the deaths being due to the operation of the disease for which it was done. These figures of course are not conclusive, but they are extremely suggestive. He strongly believed that too many mastoid operations were being done, especially upon young children, that the dangers from neglect to operate had been greatly overestimated, while those of the operation itself were not sufficiently appreciated. He would say: "Never operate when in doubt." Older children bear the operation much better.

Dr. C. J. KIPP dwelt upon the importance of an ophthalmic examination in all cases where suppurative ear disease was suspected. He had been astonished to find in so large a number of cases in children with suppurative otitis media, hyperæmia and inflammation of the optic nerve where there were few or no signs of cerebral symptoms. He considered that the presence of optic neuritis indicated at least exploration for mastoid disease. He had seen cases in which the optic neuritis developed under his eyes in which the patient recovered without other operation than paracentesis of the drumhead, yet he would advise opening of the mastoid in such cases. The ophthalmoscopic examination should begin with the development of the otitis, as occasionally an optic neuritis from other causes is already present when the child comes under observation.

Dr. E. GRUENING stated that he had been connected with Mount Sinai Hospital for a period of twenty-five years, and had during that time examined the ears of the children in the pediatric service. It was very rarely necessary to perform any operation on the ear in that service. But there is also an aural service in the same institution, and he had at present twelve cases of mastoiditis in children. This simply shows that children suffering from mastoid disease are not generally found in the pediatric service. If the pediatric physician draws the conclusion that there is no mastoiditis because he does not see mastoiditis in his service, his conclusions are not correct. The operation for mastoid disease is certainly never undertaken without positive indications. He had observed many cases of otitis media in children with typhoid fever, but had never performed an operation for mastoiditis on any one of these children, inasmuch as they got well without it. In the discussion to-night, the observations made by Professor Ponfick, of Breslau, should have been mentioned. He made a large number of autopsies on children who had died from broncho-pneumonia or from gastro-intestinal troubles. In the post-mortem examination, the cause of the trouble was found to be an otitis media purulenta, and he concluded that the pulmonary or intestinal symptoms were due to the action of the pus, either by its being swallowed or inhaled, thus exerting an action in loco, or that the symptoms were due to the toxins of the pus. Dr. Gruening stated that he had repeatedly seen in the practice of the pediatric physician children suffering from broncho-pneumonia or gastro-intestinal catarrh where the usual

remedies did not produce the desired effect, and that examination of the ear proved that the trouble was there. It is by no means an easy matter to make an otoscopic examination in such cases. It is much easier to make an ophthalmoscopic than an otoscopic examination. In the pathological demonstrations to-night, it was shown how the epidermis covering the drum thickens, and how it rises up in folds. Now when you look clinically at such an ear all the landmarks are wanting. There is no hammer, no light reflex, no folds, no redness, no swelling, nothing to guide you, and when such a membrane, showing absolutely no characteristic signs, is opened, pus is generally removed, and the children speedily get well of their broncho-pneumonia or their gastro-intestinal catarrh.

Dr. BACON spoke of the importance of investigating the pus from the middle ear. He thought that before deciding whether or not to do a mastoid operation it should first be determined whether the pus contained streptococcus, pneumococcus, or staphylococcus. The diagnosis, and especially the prognosis, depended very much on the presence of these germs. We can wait longer if we have a staphylococcus infection, but if there is a streptococcus or pneumococcus infection we cannot wait very long, for there is great danger of the disease extending from the mastoid cells into the sinus. In regard to anæsthetics, Dr. Dench had said that he administered chloroform in the case of very young children, and nitrous oxide to older children. He had seen cases of children starting in with tonsillitis, where the ear became involved, followed by a slight bronchial affection. We should be cautious in administering an anæsthetic in such cases, for fear of setting up a pneumonia. He took exception to the statement made by Dr. Dench, that he opened the mastoid cells in children when the temperature remained high after the drum membrane had been incised. Dr. Bacon considered this dangerous advice, for he had frequently seen young children who had had an attack of grippe, complicated by acute suppurative otitis media, and in whom the temperature remained high after the drumheads had been freely incised. The temperature in these cases was caused by a latent pneumonia, which did not give any physical signs for two or three days. He could not endorse the advice given by Dr. Dench to plunge the knife in different directions in the temporo-sphenoidal lobe in cases of suspected brain abscess for fear of dividing a blood-vessel and causing

hemorrhage. He preferred after incising the dura to insert a director in different directions.

Dr. QUINLAN wished to emphasize the dangers attending the presence of diseased lymphoid tissue. Hypertrophied faucial, pharyngeal, and tubal tonsils were frequently operated upon in a very crude fashion by the general practitioner with his office outfit, but more often diseased tissue was left to start up fresh trouble at every cold. He had recently seen a case of post-auricular swelling with every indication to denote the presence of an abscess in the mastoid process. This boy had been operated on for adenoids and enlarged tonsils, but the operation had not been thoroughly performed. To-day, instead of doing a tonsillotomy, a tonsillectomy should be performed; instead of adenotomy, an adenectomy. Referring to indefinite cases, accompanied by a peculiar redness of the membrane and frequently recurring attacks of catarrh, but no hypertrophy of the faucial masses, he thought that in many instances an application of nitrate of silver would not only deplete, but would render the cavity aseptic and allow a catheter to pass. He had had excellent results in two cases with this method. He condemned Dr. Jacobi's method of irrigating through the nose, on account of the difficulty of getting the child to submit to it; it is natural for all children to struggle against such a procedure. He also disapproved of Dr. Jacobi's use of powdered boric acid. The substance becomes packed in the cavity, mixes with the secretion, and you can hardly remove it with a spoon curette. The question of whether or not to operate for adenoids and hypertrophied tonsils in acute cases will continue to come up from time to time, but he thought that all the affected tissues should be removed whenever they are hypertrophied, and give nature a chance to establish a better phagocytosis.

In regard to the operation of paracentesis, he urged the importance of thoroughly cleaning the canal, and the use of sterile solutions and bichloride before the operation, in order to render it absolutely aseptic and prevent the carrying of infection into the middle ear. In addition to this, he advised the proper clothing of the children and the use of tepid- or cold-water bathing, which he regarded as a great cure for such vaso-motor disturbances. By keeping up the health of the children by such means as air, sunshine, proper diet, and light but warm garments, you immunize these little ones, so that the infection is to a large extent minimized.

Dr. ROBERT LEWIS also took exception to the practice of filling the ear with powdered boric acid. The object aimed at is to establish drainage, and with that end in view a large incision is made in the drum membrane, and the canal is cleansed with either a sterile or an antiseptic solution. The solution is not used with the idea that it may pass into the tympanic cavity and render the pus less virulent, but it is used to prevent the accumulation of the purulent exudate in the canal and thus assist in the proper drainage of the middle ear. Boric acid cannot render impotent the bacteria in the middle ear, and it can only do harm by caking and forming an obstruction to the free flow of pus. He thought it advisable that the canal should be kept as sterile as possible, and therefore, as well as to further assist the drainage, a wick of sterile or iodoform gauze should be inserted after each douching. The gauze should be renewed before it has become fully saturated.

In the early stages of acute catarrhal otitis media he had obtained excellent results by making an application of adrenalin (full strength) to the mouth of the Eustachian tubes.

In regard to early operative measures, he thought it inadvisable to be too conservative, because if a case were allowed to run too long a destructive process was established which necessitated a more extensive operation than the one for a simple mastoiditis: for in infancy there is little resistance to destructive processes, and the amount of necrosis present in cases where operative measures have been too long delayed has often rendered necessary the performance of the more radical Schwartz-Stacke operation.

Dr. TOEPLITZ said that Dr. Jacobi had stated that if there is a glandular swelling over the mastoid we should open and remove it. He himself had had several different instances in some of which this was indicated and in others it was not. In one case it was only a forerunner of rubeola, the second case was due to a traumatism of the skull, and in the third case there was a mastoid suppuration on the right, a cervical abscess of the same side, and a glandular swelling over the left mastoid. He had operated the mastoid and cervical abscess on the right and much pus came out, and under the left swelling there was also pus. Taking it all in all he did not think that glandular swellings always indicated mastoid disease.

Dr. JACOBI said that he had gotten it pretty hot and heavy but

that he thought the English language had been treated worse, and protested against the misinterpretation of his words. He said that for forty years he had written and spoken against the forcible treatment of struggling children, and that the easiest way to kill a diphtheritic child was to force a swab into its throat and make it struggle and die of heart failure. The only way to get at the throat of such a child is by irrigation through the nose, by means of a glass cup (Whitall Tatum, Bermingham, Dessar), and if that is properly done there is no milder treatment. The worst that can happen is that the child may swallow a little sodium chlorid solution or some other mild fluid. Then as to boric acid—I did not say that you must ram boric acid into the tympanic cavity. If you pour boric acid loosely into the external ear the pus will soften it, and it can be easily removed, and there is no interruption to the drainage. I believe I am not mistaken in the good that practice does, and I have continued it.

Irrigations are made by the mother or the nurse, and she does it twice a day, and keeps it up for months, and that is very often the end of the chronic nasal catarrh. There is no difficulty about it, and Dr. Quinlan may yet learn it, but it must be done regularly and for a long time. Without these irrigations, no treatment will do any good, and most of your operations are not so permanently successful as you wish them to be.

Dr. DENCH said that he had nothing to add excepting that there might be some misunderstanding about operating for no indication excepting temperature. He certainly did not say that in his paper. In deciding the question, any general disease was naturally excluded, but the danger was in waiting too long. Dr. Holt's statistics were very interesting, and he was impressed by them, but he had the statistics of several of the large hospitals abroad and knew that the number of fatal cases from meningitis and other intracranial complications was much greater than Dr. Holt's statistics would indicate. That might be explained by the fact that in the institution quoted by Dr. Holt most of the cases were not admitted as patients but were inmates of the institution living under proper hygienic conditions, and any disease was properly treated from the beginning.

Regarding the use of the knife in exploring the brain substance, he thought that if the incisions were made in the long diameter of the convolutions, rather than transversely, there was

practically no danger of hemorrhage. Of course, as to whether the knife should be used or a director, as suggested by Dr. Bacon, was a matter of personal preference. Dr. Dench certainly believed that the knife inflicted less traumatism upon the cerebral substance, and was a more certain means of making an exploratory incision than was the director.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

BY DR. ARNOLD KNAPP, SECRETARY.

MEETING, JANUARY 24, 1905. THE PRESIDENT, DR. E. B. DENCH,
IN THE CHAIR.

Dr. WHITING stated that he had recently seen three cases of **children with acute otitis where the temperature remained high and pneumonia developed.**

The first case was a child with a temperature of 105° F. There were no special symptoms. As no other cause for the fever could be discovered, he was asked to examine the ears. In one the drum was red, in the other it was very red. The posterior half had the characteristic grayish appearance due to exfoliated epidermis. Paracentesis was performed. The temperature did not diminish and remained over 105° for three days. Bacteriological examination of the discharge from the ear showed pneumococcus infection. On the sixth day a central pneumonia was found to be present. The other ear subsequently became affected. The ear trouble did not proceed, and the patient recovered.

Case 2, a young man with high temperature for which no cause could be found on physical examination. The ears presented the same picture as in the preceding case. The discharge was muco-serous in character and contained pneumococci. The temperature kept up though the ear condition did not seem to be aggravated. On the third day pneumonia developed with rapidity and assumed a malignant character, and the patient died on the ninth day. Throughout the disease the ear lesion was very mild.

The third case was that of a child of five years, also with a

high temperature, with muco-serous fluid collected in the posterior segment of the drum. In this case pneumonia also developed.

He thought these three cases illustrated a very interesting and important condition which was probably familiar to most of the members of the Society. Though the ear symptoms in all cases were not severe and subsided, the high fever kept up but was finally explained with the onset of pneumonia.

Discussion.—Dr. BACON said that some years ago he had drawn attention to the danger of giving anæsthesia for paracentesis of the ear in those cases where a lung complication was probable. He had also seen cases where the pneumonia developed a number of days later after the ear trouble. He thought that with this experience in mind we should not be hasty in judging of the presence of mastoid involvement.

Dr. HERMAN KNAPP stated that the pneumococcus infections of the ear were probably the most frequent, and that it is only rarely that a pneumonia supervenes.

Dr. SHEPPARD related an experience which he had had in the case of a child with a temperature of 105° , where a general surgeon was prepared to operate on the mastoid. He found the translucent drums yellowish from retained pus. He opposed operation and advised paracentesis. This was performed, and pneumonia developed four days later.

Dr. HASKIN said he had recently observed the case of a woman, twenty four years of age, with a temperature of 104° , who had been ill for two days. The drum was bulging, the mastoid extremely tender. He decided to operate immediately, and found an immense amount of destruction in the mastoid process, and also a perforation at the tip, with an abscess in the neck. After the operation, the temperature remained high. This was finally explained by finding an area of circumscribed pneumonia directly over the liver. He was uncertain whether to regard this as an associated infection or as an example of metastasis.

In connection with a **fistula forming in the post. meatal wall after mastoiditis**, Dr. HASKIN spoke of a woman whom he had been watching on account of an acute ear trouble, where hospital treatment could not be pursued because she was nursing an infant. The tip remained particularly sensitive for three weeks, otherwise she did perfectly well. Then a furuncle appeared in the canal. This ruptured, leaving a fistula which

entered the mastoid process, and which has discharged freely, with entire relief of tenderness.

Discussion.—Dr. WHITING stated that in his experience these fistulæ were not unusual, especially in children, and usually in the inner third of the meatus. They present the picture of a bulging mass of granulations.

Dr. BERENS had seen two similar cases in babies.

Dr. SHEPPARD recollected a case in a child of granulations coming from the posterior wall of the meatus in the depth of the canal, which presented such a color and aspect as to make him suspect tuberculosis. After shrinking with alcohol, a fistula could be seen which led to the mastoid; this was operated upon, and the case recovered normally.

Dr. DENCH had recently seen a case where there was a perforation at the extreme outer margin of the meatus. The patient did not permit an operation. The doctor had recently heard that he had recovered.

Dr. HERMAN KNAPP spoke of a recent case upon which he had operated, in which he had found a compact mastoid, except for a number of very minute cavities. The patient had not shown any very marked symptoms; the tip, however, was quite tender. At operation, there was no supra-meatal spine visible, and the antrum was exceedingly small. At present the bone in the upper part of the wound was distinctly infiltrated. He regarded the condition as a disseminated osteitis, or as an osteomyelitis in a diploic mastoid.

Dr. WHITING inquired whether the zygomatic cells were not involved in this case.

Dr. KNAPP replied, No; that the lesion appeared to be of the bone farther down and back.

Dr. BRYANT thought from the description that the case was one of a pneumatic mastoid, and that the morbid process should be regarded as an osteomyelitis.

Dr. HEPBURN related a case in which he found a polyp in the depth of the canal, which was located at a sinus leading into the mastoid. The drum was intact. The patient, after removal of the polyp, apparently did perfectly well, until after five years he returned with granulations in the same place.

Dr. ALDERTON thought that these instances of fistulæ in the walls of the canal simply meant that they were cases in which the posterior wall happened to be the thinnest wall of the

mastoid, and that consequently perforation took place in that part.

Dr. BRANDEGEE related a case which he had recently operated upon, unusual on account of the **abnormal développement of the zygomatic cells on both sides**. The patient had a temperature of 104° , was covered with perspiration, and seemed very septic. There was enormous destruction of both mastoid processes, and also an unusual development of cells in the root of the zygoma—so much so that a probe admitted at the anterior wall of the mastoid could be passed forward two inches through the zygomatic process.

Dr. WHITING in this connection spoke of a child he had seen where an incomplete mastoid operation had been done. The side of the head became enormously swollen and the eyelids were so œdematous that they could not be opened. The picture appeared like one of a cavernous sinus thrombosis. On examination, he had found an unusually tender area directly back of the external angular process of the frontal bone on that side. He advised exposing this entire region, which he then did, and found the bone in this unusually tender region exposed, superficially perforated, and was able to pass a probe backwards from this perforation to the zygomatic cells. This tract was laid bare, and the zygomatic cells, which were, of course, the starting-point of this extension, were thoroughly eradicated. He thought that this part of the field of operation was frequently neglected, and spoke of the importance of always searching for these cells.

Dr. ALDERTON had encountered unusually developed cells in the zygomatic region at all ages.

Dr. PHILLIPS related a case of **extensive operation for chronic purulent otitis** and spoke on **nerve anastomosis in facial paralysis**. A woman had had a mastoid operation performed twelve years ago, with apparently an extension into the neck, because below the mastoid and in front of the sterno-mastoid muscle there was a deep excavation. A fistula in this situation led $\frac{1}{4}$ inch inwards. There was an almost complete facial paralysis. He operated upon this patient and found that the sinus ended apparently blind below the external canal. The mastoid antrum had not been opened and he thoroughly exposed all the middle-ear cavities. The wound apparently did very well and remained healed for a considerable length of time, then after a fresh cold, reinfection of the cavities took place

with renewed discharge. Owing to the recent attempts to anastomose the facial nerve with either the hypoglossal or the spinal accessory in cases of facial paralysis, and as Dr. A. S. Taylor had had fair success in two cases, he decided that at the next operation which he should undertake to cure the discharge from the ear an attempt should also be made to connect the nerve trunks. After the second radical operation, Dr. Taylor proceeded to make an incision along the anterior border of the sterno-mastoid below the ear, and searched an hour and a half in vain for the facial nerve.

Discussion.—Dr. BERENS stated that an anastomosis with the spinal accessory had been in general abandoned in favor of the hypoglossal nerve. He inquired whether the stylo-mastoid foramen was found.

Dr. PHILLIPS replied, No.

Dr. ALDERTON said that he had recently observed two patients upon whom Dr. Bristow, of Brooklyn, had operated for facial paralysis of long standing. In the first case the nerve was easily found; in the other case, where the paralysis was of many months' standing, the nerve was found very much disorganized, yellow, and shrivelled. Dr. Alderton said he could very well understand that if this disorganization should continue a stage must supervene where the nerve would no longer be recognizable.

Dr. BRYANT quoted a case which had been operated upon by Dr. Keen, of Philadelphia, in which also the nerve was found too disorganized to attempt anastomosis.

Dr. DENCH said that Ballance sometimes performed this operation in two stages, exposing the spinal accessory or hypoglossal at the first sitting, and, if the search for the facial was a difficult one, this was postponed for a second operation.

Dr. BRYANT said that after a study of the reported cases of this nerve anastomosis he had not been able to encounter any satisfactory results which warranted the undertaking of the operation.

Dr. DENCH said that in his experience permanent facial paralysis was an extremely rare sequel to the radical operation. This was true of all cases, even those in which the facial paralysis came on immediately after the operation, and appeared as soon as the patient recovered from the general anæsthetic. He had seen these cases persist for eight or nine months after the operation, and yet ultimately recover.

Dr. HARRIS had recently seen a patient whom he had treated ten years ago. The case was one of residual purulent otitis, who told him that while travelling in Mexico at a high elevation in the mountains, when the others could not hear so well, her hearing was improved, to again return to its former condition on descending to the usual level.

Dr. HASKIN had observed a somewhat similar case in a patient suffering from chronic aural catarrh, who, in travelling across the Rocky Mountains, found her hearing improved, while the other normal-hearing persons had difficulty with their hearing.

Dr. BRYANT asked whether it was not a similar phenomenon which followed the use of the catheter.

Dr. HASKIN thought that this did not explain the condition, as the two tubes in his case were patent and the air pressure must have been the same on both sides of the drum.

Dr. DENCH inquired whether the improvement in hearing was for all sounds or for conversation only. The improvement in the power to hear conversation more distinctly, he said, might be explained by the fact that those with normal hearing might have been rendered somewhat deaf on account of the low atmospheric pressure. These individuals would necessarily raise their voices in talking, and their companions, whose hearing was impaired, might therefore hear them more distinctly, and assume that the change in the atmospheric pressure had caused some improvement in the hearing.

Dr. HASKIN showed a **dental syringe** which consisted of a medicine-dropper with a platinum wire tip. This could be bent and was useful in placing medications at certain regions in the tympanum and attic.

Dr. ALDERTON asked the opinion of the Society whether concussion of the brain from the mastoid operation can be considered a predisposing factor in causing leptomeningitis. A patient two weeks after an injury (a fall in which the mastoid process was struck, but no rupture of the soft parts nor of the bone) developed mastoid symptoms. He was called in and found the external ear-canal obstructed by a plug of wax. After removal, the drum appeared congested and slightly bulged, but no perforation. The mastoid was opened and the cells were found to contain pus. The case did apparently perfectly well for two weeks, and then suddenly meningitis set in, which rapidly led to the patient's death. At autopsy there was no connection between the petrous

bone and the meningitis. The dura over the base of the skull was abnormally separated from the underlying bone. The sinuses all contained fluid blood. There was well-marked purulent leptomeningitis with areas of superficial ulceration of the brain. The mode of infection of the brain was thus not explained by the autopsy, unless the infection took place through the lymphatics.

Dr. ARNOLD KNAPP inquired whether any symptoms of labyrinth involvement were observed?

Dr. ALDERTON replied that it was not possible to make a complete examination.

Dr. KENEFICK related the case of a boy who after a fall developed a typical cerebro-spinal meningitis during the past summer. This was followed by the characteristic gait. He now applied at the Infirmary for treatment for deafness.

Dr. PHILLIPS said that there was considerable literature recently published upon the variety of metastatic inflammations, especially of the joints, which are seen after mastoiditis, and this had raised the question in his mind whether the mastoiditis was not possibly a metastatic infection from some other source. For instance, he had recently observed a case of mastoiditis occurring six weeks after an operation for appendicitis.

Dr. QUINLAN had also observed a case of mastoiditis occurring three weeks after an operation for appendicitis.

Dr. ARNOLD KNAPP related a case of **severe vertigo due to caries of the labyrinth cured by operation**. The patient, male, twenty-five years of age, had a chronic purulent otitis of many years' standing, though the only symptom now was very distressing vertigo. The vertigo recurred a number of times every day. On examining the ear, a large central perforation was found. There apparently was no cholesteatoma, nor any retention to explain the vertigo, except that, upon investigation with a probe in the region of the descending process of the incus, a mass of granulations was encountered. He thought that this presumably was in connection with the stapes and advised an operation. At operation considerable caries was found in the posterior segment of the tympanum, and the previously observed mass of granulations was found to be adherent in this region and to extend through the oval window into the labyrinth. No stapes was found present. The operation was performed four weeks ago. The attacks of vertigo have ceased.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1904.

BY DR. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY.

1. Zuckerkandl. On the Eustachian tube of the ant-eater. *M. f. O.*, 1904, No. 1.
2. Falta. An important anomaly of the naso-lachrymal duct. *M. f. O.*, 1904, No. 3.
3. Breuer. Studies on the vestibular apparatus. *Sitzungsber. d. Wiss. in Wien. Mathem.-naturw. Klasse*, vol. 112, Nov., 1903.
4. Urbantschitsch. On the localization of sound perception. *A. f. Ges. Phys.*, vol. 101.
5. Rethi. The secretory nerves of the soft palate. *Wiener med. Presse.*, Nos. 5 and 6, 1904.

1. Opposed to the view expressed by Hyrtl in his paper on the auditory organ, 1845, that the bony tube is apparently absent in the *Myrmecophaga jubata*, ZUCKERKANDL has examined macroscopically and microscopically the skull of the ant-eater and finds that this animal possesses an Eustachian tube, about 15cm long without any cartilaginous fundament, which is attached to the margin of an opening in the temporal bone and by this communicates with the tympanum. The author believes that this opening has been mistaken for the carotid foramen by Hyrtl.

PIFFL.

2. In a woman forty-three years of age, who was being treated on account of purulent dacryocystitis, it was found, on probing the naso-lachrymal canal of the right side, that the canal did not, as is usual, terminate between the lateral wall of the nose and the

inferior turbinal, but passed superficially from the middle meatus over the inner aspect of the lower turbinal and terminated at its free border. The naso-lachrymal canal of the left side had a normal course. The cause of this deformity, which has previously not been described, is supposed to have been a premature closure of the fissure which exists in foetal life between the eye and the nose.

Finally the author draws attention to the increased danger of injury which such an abnormally placed naso-lachrymal duct encounters from intranasal operations on the lower turbinal.

PIFFL.

3. This study consists of four sub-divisions which are not in direct connection.

Chapter I. presents anatomical contributions, especially on the finer histology of the cupula terminalis which BREUER definitely regards as an organized tissue present in the living and not an artefact. The anatomical structure of the cupula has led him to the conclusion that his opinion, expressed in 1875, is incorrect, in which he regarded the cell hairs as curved and deformed by the motion of the endolymph and that thus the nerve terminals are excited. The cupula can only be moved as a whole. It is, moreover, impossible that these hair cells can transmit sound perception as they are connected to the cupula by mucus. The supposition which Ewald has advanced is also untenable, viz., that the cell hairs are moved and act like ciliated epithelium. Breuer believes that the ampullary apparatus is influenced by positive and negative angular velocities and not by permanent ones. These produce a momentary displacement of the endolymphatic ring and of the cupula, and thus the hair cells become stretched and the nerve apparatus on one side of the crista is irritated. These produce, as long as they exist, the sensation of rotation, which continues until the normal condition is again restored by a counter blow from the negative acceleration on cessation of rotation or the slowly working elasticity of the structures put on stretch is restored. As regards the semicircular canals, attention is drawn to the fact that the anterior canal is one-third longer than the two others. As this third, however, is not curved in the same plane as the other two-thirds it consequently cannot be functionally important. In other words, all three canals are equally important functionally. The anatomical structure of the ampulla is also described. This, as well as the

structure of the cupula, should be read in the original. Breuer regards the endolymph as secreted in the saccule and in the cochlea and that it passes from the saccule through the aqueduct of the vestibule into the cranial cavity.

Chapter II. Breuer has repeated the experiments with cocaine of Koenig, and comes to the conclusion that the head rotation of doves is a symptom of defect; moreover, that galvanic vertigo and galvano-tropic reaction are produced in the labyrinth; also that Flourens's phenomena of head rotation and circular motion are also symptoms of defect.

Chapter III. Electric stimulation of the various ampullæ. The question whether it is possible to stimulate an individual ampulla electrically is still undetermined for me, notwithstanding the positive examinations of Breuer. In any case the result frequently varies, and, as Breuer himself states, it is no lecture-room experiment.

Chapter IV. Professor Hensen's objections against the static function of the labyrinth. In this chapter Breuer contradicts the objections advanced by Hensen on account of a series of facts which apparently show that a static sense must exist in the sense of Ewald.

DREYFUSS.

4. These experiments are on the localization of the various tuning-fork tones in monotic and diotic sound transmission. Hearing tubes of about 1 mm in length are employed to conduct the sound in these experiments. The following points can be specially mentioned from a great multitude of interesting observations. The various tones which are transmitted to the ear frequently possess various places of localization which are located in the form of points, stripes, or planes in and about the ear. On simultaneous transmission to both ears a subjective auditory field is produced in the head which in one-sided deafness is transposed towards the better-hearing ear. Various vowels projected into the ears of the extremely deaf may produce a sensory impression rather than an auditory one, in which there is a definite position in the ear or in the head for each vowel, so that from the localization of the sensory apparatus, but without sound perception, an improvement in the hearing of the vowel is possible.

BRUEHL.

5. RETHI has made about 150 experiments on dogs, rabbits, and principally on cats. Before the experiments the mucous membrane was carefully dried with cotton.

On using an induction current a distinct secretion takes place at each part of the soft palate on the location of a double electrode in its immediate vicinity. On repeated stimulation the secretion becomes less and finally was exhausted, but after a certain period of rest returned to its former amount. After injecting atropine in the soft palate no secretion could be obtained even with the strongest current.

Various nerves were investigated in order to determine which nerves produced the secretion.

Irritation of the trunk of the fifth nerve within the cranial cavity, of the lingual nerve, of the root of the glosso-pharyngeal nerve, of the spinal accessory, vagus, and hypoglossus, produced no secretion. Peripheral stimulation of the glosso-pharyngeal nerve, of the resected vagus after leaving the skull, and of the hypoglossus, also produced no effect.

After stimulating the vagus root a decided elevation of the soft palate follows. This also occurs on peripheric irritation of the pharyngeal branch of the vagus. Occasionally on the posterior smaller half on the irritated side some secretion is observed.

Central stimulation of the facial produces secretion in the velum on the irritated side and throughout its entire extent. Peripheric irritation is followed by no secretion.

On dividing the sympathetic at any level in the neck, and on irritating the proximal end, secretion promptly follows on the irritated side of the soft palate. Repeated irritation has always the same result. Mechanical irritation produced no secretion.

This experiment shows that in the secretion from the fibres of the facial and of the sympathetic we have not to deal with reflex phenomena.

True secretory fibres for the glands of the soft palate on the same side of the head are conveyed in the cervical sympathetic as well as in the trunk of the facial nerve.

In the second part the author has shown the peripheric course of the sympathetic nerve and of the secretory fibres contained in the origin of the facial nerve. These experiments were made on cats.

The secretory fibres of the sympathetic and of the facial nerve have different positions in the region of the tympanum. The sympathetic fibres enter the tympanum in the small bony channel, and those of the facial pass in the bony canal over the great superficial petrosal nerve, then they travel united to the velum

and together enter the spheno-palatine ganglion. The vasodilators have frequently the same course as the secretory fibres.

The fibres in the cervical sympathetic in the region below the lowest ganglion which are destined for the glands of the soft palate pass through the superior cervical ganglion, enter the tympanum together with the dilators of the pupil, pass over the promontory, and enter the spheno-palatine ganglion. In some cases the secretory fibres for the posterior parts of the soft palate enter the pharyngeal branch of the vagus, and continue their course in company with the fibres for the elevator of the soft palate.

The secretory fibres contained in the trunk of the facial nerve travel through the knee and the great superficial petrosal nerve to the ganglion, and then together with the above-mentioned in the palatine nerves to the soft palate.

Finally a few clinical observations are mentioned which are at the present time of little importance. WANNER.

GENERAL.

a.—GENERAL PATHOLOGY.

6. Ferreri. The relation of the sympathetic nerve to certain aural lesions. *Arch. internat. d'otol.*, etc., 1904, p. 1.
7. Lannois. Otitis varicellosa. *Allgem. Wiener med. Ztg.*, No. 10, 1904.
8. Rivière and Thévenot. On actinomycosis of the ear. *Revue de Chirurgie*, 1904, p. 42.
9. Manciolli. Tobacco: lesions of the ear, the nose, and the throat in the employees of the Royal Manufactory in Rome. *Archiv. internat. d'otol.*, etc., 1904, p. 421.
10. Schwabach. On the action of certain remedies on the ear. *Deutsche med. Wochenschr.*, No. 11, 1904.
11. Spira. Eye and ear, their similarity and varying relation. *Wiener klin. Rundschau*, Nos. 3-8, 1904.
12. Mink. Apparatus to diminish the sound in the examination of hearing. *La Presse oto-laryngologique Belge*, ch. 3, 1904.
13. Gowsejew. A new method for detecting simulated deafness. *Russkij Wratsch*, 1903, No. 49.
14. Stein. The clinical importance of the centrifuge for the diagnosis of certain nervous diseases. *Medicinskoje Obosrenje*, 1903, No. 17.
15. Stein. A dynamic goniometer. *Separatdruck*, Moskau, 1903.
16. Mongardi. Three new anæsthetics for general narcosis in short operations. *Arch. internat. d'otol.*, etc., 1904, p. 425.

17. Stein. A new instrument (plegometer). *Separatabdruck*, Moskau, 1903.
18. Fränkel. A light-weight forehead reflector. *Arch. f. Laryngol.*, vol. xiv., ch. 3.
19. Collet. On salpingoscopy. *Arch. internat. d'otol.*, etc., 1904, p. 25.
20. Urbantschitsch. A self-retaining nasal speculum. *M. f. O.*, 1903, No. 12.
21. Glatzel. On the examination of the permeability of the nose. *M. f. O.*, 1904, No. 1.
22. Warnecke. External asepsis in operations on the nose. *Arch. f. Laryngol.*, vol. xiv., ch. 3.
23. Schleifstein. Paraffin as a cosmetic remedy. *Arch. f. Laryngol.*, vol. xiv., ch. 3.
24. Joseph. Some remarks on Gersuny's article on several cosmetic operations. *Wiener med. Wochenschr.*, No. 1, 1904.
25. Cordes. A pharyngeal scissors. *M. f. O.*, 1904, No. 2.
26. Litwinociwz. A tonsillotome for the lingual tonsil. *M. f. O.*, 1904, No. 3.
27. Engelmann. A mouth gag. *Wiener med. Wochenschr.*, No. 1, 1904.

6. A man, forty-nine years of age, with the typical symptoms of exophthalmic goitre, suffers from continuous bilateral tinnitus, which is so annoying that the patient thought of suicide. On examining the ears, the hyperæmic tympanic mucous membrane appeared through the delicately injected drum. Two weeks after the bilateral extirpation of the superior cervical ganglion, the eyes are less prominent, the redness in the face and the swelling of the thyroid are less. The drum and the tympanic mucous membrane are less injected. The tinnitus is bearable, and the patient can again sleep at night. The hearing is improved. The author believes that in many cases of tinnitus an affection of the sympathetic nerve is present, even when no signs of exophthalmic goitre exist.

OPPIKOFER.

7. LANNOIS reports two cases in which varicella produced relapses of aural affections; in addition, some caused acute suppuration, one of which required operation. He concludes as follows:

(1) Varicella exceptionally affects the ear.

(2) The varicellous symptoms in the ear are new attacks or relapses of a catarrhal otitis media, or of previously existing suppurations which arise after the onset of the pharyngeal affection.

(3) Varicella sometimes produces purulent otitis, and then may be complicated with mastoiditis.

WANNER.

8. A man, thirty-six years of age, was taken ill with severe pain in the left ear; discharge after two weeks. Several days after the onset of the otorrhœa a very hard swelling appeared over the mastoid process and the left side of the neck corresponding to the upper two-thirds of the sterno-mastoid muscle. Numerous small superficial ulcers formed in this location and perforated spontaneously. At the depth of the ear canal there is a swelling, resembling a ruptured furuncle. Microscopic examination of the pus from the ear and from the abscesses revealed actinomycosis. The drums were normal, no perforation sound, mouth organs without anomaly, general condition good. The abscesses in the neck were opened. The mastoid process is normal, and is not opened. Recovery after five months. According to the author, the actinomycosis began in the external auditory canal.

OPPIKOFEK.

9. In 335 cigarette girls, a chronic pharyngitis was present in 301. In all cases there was chronic rhinitis. The tobacco dust exerts a mechanical irritation on the mucous membranes; the chemical action of the nicotine is of less moment in the causation of these catarrhs. Ear disease is unusual. It can be regarded as an accidental condition.

OPPIKOFEK.

10. A young woman, twenty-five years of age, had used Fowler's solution for a long time, on account of a chronic eczema, and suffered from a catarrh of the mucous membranes of the nose, ears, and eyes. After all other remedies had been unsuccessfully tried, the symptoms disappeared on discontinuing the arsenic. These symptoms consisted in severe deafness, subjective noises, catarrh of the nose and of the naso-pharynx, lachrymation, and conjunctivitis.

A girl, twenty-eight years of age, became ill with fibrinous pneumonia, and took 4.5g salipyrin for two days on the advice of her physician. After 1.5g had been taken, deafness and intense tinnitus were complained of; examination with tuning-forks revealed an affection of the sound-perceiving apparatus. Thinking that salicylic acid, like quinine, caused a hyperæmia and vascular congestion, SCHWABACH prescribed ten drops of ergot three times daily, with the result that the tinnitus ceased completely and the hearing was much improved. The author, however, would only recommend this remedy at present with considerable reserve, as the recent investigations of Wittmaack

show that, at least for quinine, the disturbances in the hearing are not the result of a circulatory disturbance, but from a direct injury of the ganglion cells in the spiral ganglion. Nevertheless ergot could be tried on suitable cases, as it is not associated with any danger or unpleasantness for the patient.

NOLTENIUS.

11. The contents of this unusually extensive article are well known to the specialist, and a great amount of the collected material is not suited for a short review, but should be read in the original.

WANNER.

12. MINK has constructed an apparatus by which he is able to reduce the hearing for whispering to one-fifth. It consists of an old-fashioned chloroform mask and a funnel whose small opening is covered with two layers of thin silk.

BRANDT.

13. On stroking the back of the patient with his clothes on, first with the hand, then with a brush, and then simultaneously stroking his back with a hand and the arm of the physician with a brush, the really deaf will give correct answers, as he depends solely upon the sense of touch. The malingerer, on the other hand, will become confused in his answers, as he will confuse the auditory impressions with the tactile impressions, and he will not be able to tell exactly whether he feels the touch of the hand or of the brush whose noise he hears.

SACHER.

14. According to the author, with the aid of the centrifuge and of the goniometer, a number of new symptoms are obtainable. This apparatus is not so important for the aurist as for the neurologist. The centrifuge may also be used for therapeutic purposes, as it exerts a great influence in general metabolism. Continuous and violent centrifuging of dogs when lying with their heads toward the periphery produced a hyperæmia of the brain. If the head was directed toward the centre, the brain became anæmic. In some patients, tinnitus disappeared under the centrifuging after a moderate rotation in a vertical direction in certain sick persons, and in healthy persons sleepiness sets in. The centrifuging acts favorably upon vertigo.

SACHER.

15. The goniometer is an apparatus constructed by the author, which is to be attached to the centrifuge, by which in the various changes in direction the deviation of the head can be exactly determined. The construction and use of this instrument are illustrated by a number of pictures.

SACHER.

16. The following three narcotics are recommended for short operations: Somnoform (a mixture of 60 parts of ethyl chlorid, 35 parts of methyl chlorid, and 5 parts of ethyl bromid), ethyl chlorid, and liquor somniferus (methylen and ethyl ether). These three agents are all without danger, have no unpleasant side effects, and after the narcosis sleep begins immediately. The narcosis was induced in a healthy boy of ten years. A few seconds after beginning, a severe collapse set in. In two of the remaining four cases in adults deep narcosis could not be obtained.

OPPIKOFER.

17. The investigations of Curschmann, Bornhardt, Spamer, and others have shown in animals that the extremities on the same side as the affected labyrinth are weaker than those on the healthy side. The same observations have been made by Wanner in patients with diseased labyrinths. After a blow with the full hand on the shoulders, the patients would fall and were more inclined to fall to the side of the diseased labyrinth than on the other. In this method of examination it is impossible to always reproduce a blow of the same intensity, so that the results cannot well be compared. With the apparatus constructed by the author a blow can always be given with the desired force, so that the results can be compared.

SACHER.

18. Description of a forehead mirror which has a metallic rim of only 1cm in breadth. The remaining part of the black surface is protected by a thin plate of hard rubber. A mirror with a diameter of 10cm weighs only 71g.

ALBANUS.

19. COLLET recommends salpingoscopy for the careful examination of the opened maxillary cavity of the interior of the nose, and especially to examine the naso-pharynx.

OPPIKOFER.

20. This instrument consists of a nasal speculum which is attached to a spectacle frame.

PIFFL.

21. The author has again taken up the idea of Zwaardemaker to determine the amount of deposition of vapor contained in the respiratory air on a cold mirror or metallic surface in order to determine the patency of the nose. He has for this purpose devised a mirror of tin which can be sterilized. The varying degree of the respiratory area and the varying length of time which it takes this area to disappear give a distinct method for determining the patency of the nose. If this examination

shows a difference, then the patient should be examined by rhinoscopy.

PIFFL.

22. The author uses a thin elastic sheet of rubber in nasal operations, which hangs down over the lips and chin and is held in place behind the head. An infection of the instruments and of the dressings is thus avoided.

ALBANUS.

23. In two cases of ozæna with saddle-shaped deformity of the nose, the injection was successful; the fetor of the ozæna disappeared on the simultaneous use of irrigations. In the first case, on injecting paraffin melting at 40° C., and in the second case, where hard paraffin was employed, transient swelling in the surrounding parts took place. The injected paraffin is after a time replaced partly by a compact connective-tissue, which, however, does not affect the function of the paraffin. Hard paraffin, melting at 54°, does not produce any marked irritation compared with soft paraffin at 36°, hence can be better employed. The use of paraffin for cosmetic purposes is only justified in excessive deformities and only by the wish of the patient. For curative purposes, however, it can be employed.

ALBANUS.

24. JOSEPH asserts his priority claims and recommends the wedge-shaped resection for diminishing the size of the auricle. After a number of weeks or months paraffin injections in the nose have in a certain proportion of cases been followed by a moderately intense redness of the skin as well as the presence of swellings and nodules which at first interfered greatly with the cosmetic result. Displacements of the paraffin occasionally occur.

WANNER.

25. As the lateral folds of the pharynx sometimes remained hanging after attempted removal, CORDES has constructed a pair of scissors whose points are crossed.

PIFFL.

26. A modification of the well-known Schuetz tonsillotome, so that its curve is adapted to the situation of the lingual tonsil.

PIFFL.

27. This instrument is in the form of a pair of forceps, and can be used to open the jaws, as well as an oral speculum.

WANNER.

b.—DEAFMUTISM.

28. **Mariage.** The measure and the development of hearing in deaf-mutes. *Arch. internat. d'otol.*, etc., 1904, p. 30.

29. Coen. On suggestive and disciplinary factors in the treatment of stuttering. *Wiener med. Wochenschr.*, No. 8, 1904.

28. The hearing of twenty-four deaf mutes was examined by a sirene which produced the vowels *a, e, i, o, u*. This same instrument was employed in order to give hearing exercises for a period of six weeks. The author concludes that the deaf-mutes not only possessed hearing remnants, but that in cases of total deafness the hearing power can be improved by exercise. The vibrations produced by this apparatus are neither painful nor fatiguing; on the contrary, the deaf-mutes on hearing them were much pleased.
OPPIKOFEK.

29. Individuals who stutter have a peculiar nature. In endeavoring to correct their stuttering, it is first of all necessary to overcome their retiring, diffident dispositions. For this it is necessary that they should look at the speaker with raised head. The fear for speaking must be counteracted. In addition to the local treatment there should be general treatment suited to the character and personal peculiarities of the patient.

WANNER.

EXTERNAL EAR.

30. Juergens. Three cases of burning of the ear with vinegar essence, and a report of the further course of a case observed a year ago, published in this periodical. *M. f. O.*, 1903, No. 12.

31. Boehm. On injuries of the drum membrane after indirect violence. *M. f. O.*, 1904, No. 3.

32. Chorenshitzky. A transverse bullet wound of the external auditory canal. *M. f. O.*, 1904, No. 1.

33. Alt. Foreign bodies in the middle ear. *Wiener klin. Rundschau*, No. 2, 1904.

30. The combustion of the ear took place in the three cases in soldiers who endeavored to avoid military duty. In the first case, the drum perforated with a chronic purulent otitis. In the second case, recovery took place, with a dry perforation of the drum. In the case previously reported, with a total defect in the drum, a combustion of the inner labyrinth wall, and injury of the labyrinth, after one year the labyrinth wall was covered with epidermis and the hearing was improved, though suppuration still persisted.
PIFFL.

31. This is a report of three cases of rupture of the drum observed in Haug's Polyclinic in Munich. The ruptures were

the result of force acting upon the opposite side of the head, produced in two cases by a blow on the ear, and in the third by a blow on the lower jaw of the opposite side. In the two cases the drum was atrophic, in the third it was partly calcified. The author believes that in these three cases the ruptures took place by contrecoup, and discusses at length the mode of origin of ruptures of the drum.

PIFFL.

32. The bullet struck the zygomatic process, was then deflected backwards and downwards, lacerating the anterior and inferior walls of the cartilaginous canal, was deflected downwards and backwards by the mastoid process, and rested finally in the skin over the 6th and 7th cervical vertebræ. The middle ear was not injured. The wound was healed with stenosis of the auditory canal.

PIFFL.

33. The methods of treating foreign bodies are briefly reviewed. Two cases are reported in which unsuccessful attempts to extricate foreign bodies led to displacing the foreign body into the tympanum, and an operation was required, consisting in the detaching of the auricle and resection of the posterior canal wall.

WANNER.

MIDDLE EAR.

a.—ACUTE OTITIS.

34. Veis. The prophylaxis of acute otitis media. *M. f. O.*, 1904, No. 2.

35. Wojatschek. On the function of the auditory canal in acute diseases of the middle ear and its adnexa. *Dissertation*, St. Petersburg, 1903.

36. Gerber. On labyrinth necrosis. *A. f. O.*, vol. lx., p. 16.

34. In order to prevent the otitis following attempts to blow the nose, the author recommends that the nose should be blown with both sides of the nose kept perfectly free. The suggestion is unquestionably in order, though it does seem doubtful if by this means most purulent catarrhal inflammations of the middle ear can be avoided.

PIFFL.

35. After examining twenty-seven patients, the author states that in acute diseases of the middle ear, air-conduction for all sources of sound is diminished. During convalescence, hearing for whisper is more quickly recovered than for the tuning-fork. Hearing sinks almost uniformly throughout the entire tone series. Bone-conduction is frequently increased. Immediately after closure of the wound of the drum the hearing is improved.

SACHER.

36. A report of a case of total labyrinth necrosis which was operated upon. The patient was a girl, twelve years of age, suffering from a purulent otitis after scarlet fever eight years ago. A very early onset of the facial paralysis with complete absence of disturbance of co-ordination is noticeable, also the occasional pyæmic character of the temperature in a not thrombosed sinus, as well as a rapid pulse persisting to convalescence. The cases of labyrinth necrosis which were collected in 1898 by Pesch are augmented by 12 additional cases by the author. A statistical study of these 90 cases then follows, with especial regard to the course, the cause, situation, extent, symptoms, and termination.

HAENEL.

b.—CHRONIC PURULENT OTITIS.

37. Schulze. Investigations on caries of the ossicles. *A. f. O.*, vol. ix., p. 252.

38. Klug. On hemorrhage from internal carotid artery, following caries of the temporal bone. *Jahrbuch für Kinderheilkunde*, N. F., lv., H. 4.

39. Schulte. Aneurism of the carotid artery in the middle ear. *M. f. O.*, 1904, No. 3.

40. Politzer. On intra-auricular transplantation of Thiersch grafts after the radical operation. *Wiener klin. Wochenschr.*, No. 12, 1904.

37. The material examined consisted of 22 hammers and 17 anvils, which were removed from 10 cases of cholesteatoma and 14 cases of caries, and was examined histologically, with the following results: Almost all of the ossicles showed the typical picture of lacunar bone absorption, which was present in various forms. Under caries are counted, in addition to the cases with rough superficial surfaces bared of the soft parts, the cases where the bone was undergoing destruction underneath infiltrated or thickened periosteum occasionally covered with an intact mucous membrane or a cholesteatomatous matrix. Contrary to the views of Brieger and Goerke, the preceding disease of the periosteum and the secondary extension of the process to the bone is always the rule. The chief cause of the disease of the bone is a local disturbance of nutrition, though there may be an associated anomaly of nutrition, as scrofula (tuberculosis). The local causes consist in retention and fermentation of pus, as Scheibe has shown. The author does not think that the presence of cholesteatoma is the main factor in pus retention and fetor.

The results of these examinations have shown SCHULZE that the recent more conservative treatment of caries of the ossicles

is not justified, though a recovery from carious disease of the ossicles can take place without operation, and attempts with irrigation through the tube, etc., may be indicated in certain cases. In cases of isolated caries of the ossicles, the extraction of the hammer and anvil should be undertaken. If the otoscopic examination cannot exclude bone disease in the antrum and the aditus with probability, the radical operation should be undertaken. He reviews the various objections advanced against the extraction of the ossicles, especially the view that an isolated caries of the ossicles does not exist, and that the removal of the ossicles interferes with the hearing. He is not able to find any reason why the ossicles should be retained in the interests of hearing, and is especially opposed to the method of radical operation which has recently been suggested by Siebenmann, where the tympanic margin and the ossicles are preserved. This is followed by a very much more obstinate and painful after-treatment, and incurs the danger of relapse of cholesteatoma.

HAENEL.

38. A tuberculous child four years of age suffered from a left-sided purulent otitis. At operation, two large sequestra, which included almost the entire petrous bone, were removed. Twenty-two days after the operation on changing the dressing immediately after removing the tampon a very profuse bright-red hemorrhage took place, which ceased upon tight packing the depth of the wound. Death occurred three days later, though the hemorrhage did not recur.

At autopsy, pulmonary tuberculosis and circumscribed purulent meningitis were found.

In the depth of the wound the carotid was found exposed at the convex side of the bend. In the region where it changes from a vertical to a horizontal course an opening was found in the wall of the vessel.

The success of the packing in arresting the hemorrhage was due to the pad directly compressing the vessel in the depth of the wound.

HOELSCHER.

39. A woman, twenty-six years of age, had a left-sided chronic purulent otitis with large perforations through which a round tumor with smooth surface protruded, which was at first taken for a polyp, then for a purulent cyst and incised. Immediately a stream of bright-red blood issued forth, which ceased upon

packing. Three days later, a very severe hemorrhage took place, which could not be controlled by packing. The left common carotid was ligated without causing any disturbance of cerebral function. In the subsequent days repeated hemorrhages occurred, which did not cease until injections of gelatin, repeated every two or three days, were made. The tumor is regarded as an aneurism of the internal carotid, protruding into the tympanum through a dehiscence of the bone.

PIFFL.

40. The various methods of forming flaps from the auditory canal and of transplantation are discussed. Recently in the author's clinic the Panse meatoplasty was performed and the wound behind the ear was immediately closed after the operation.

The transplantation was practised in cases where a Panse or a Koerner meatoplasty had been made, and after an interval of six to twenty days, as soon as the surface of the wound was covered with a layer of granulations. Previous to the transplantation, the ear is irrigated with sterilized water, then filled with 6 % hydrogen peroxid. The wound is dried out with cotton and tamponed. Then in three to four hours the operation of transplantation takes place. A skin flap is removed from the thigh or the forearm, measuring 1-2 cm in size. These grafts are placed upon a glass canula which is perforated with a number of openings. The end of the canula is in connection with a blowing apparatus. The canula is introduced opposite the ear to be covered by a graft, and the graft is blown upon the wound surface; then packing with small pledgets of cotton. The apparatus is illustrated.

In 12 cases which were treated by this method, the wound was entirely dry at the first change of dressing in 5; the grafts had taken. In 5, the region of the tube showed some discharge and the grafts had not taken. In 3 of these cases epidermization followed the use of chromic acid, and in 2 there was no result.

WANNER.

C.—CEREBRAL COMPLICATIONS.

41. Milligan. A short note upon a preliminary step in the operative treatment of cerebellar abscess. *Journal of Laryngology*, June, 1904.

42. Horder. A case of bacillus pyocyaneus pyæmia following ear disease. *Lancet*, April 23, 1904.

43. Emery. A new pathogenic bacterium causing basal meningitis in infants. *Lancet*, Aug. 27, 1904.

44. **Knagga.** A case of abscess of the temporo-sphenoidal lobe presenting symptoms of "amnesic aphasia"; operation; recovery. *Lancet*, Sept. 19, 1903.

45. **Wolferz.** A case of otitic cerebral abscess. *St. Petersburger med. Wochenschr.*, 1904, No. 1.

46. **Haiké.** Tuberculous meningitis after acute purulent otitis media in one case complicated with chronic internal hydrocephalus. *Jahrb. f. Kinderheilk.*, 58, 4.

47. **Hoelscher.** Otitic diseases of the meninges. I. Diseases on the external surface of the dura mater. *Bresgens Sammlung VII.*, 6, 7, herausgegeben von Dr. Heermann in Keil.

48. **Kobrak.** On the pathology of otitic pyæmia. *A. f. O.*, vol. 60, p. 1.

49. **Streit.** A cured case of severe otitic sinus thrombosis with meningeal symptoms. Exposure of the jugular bulb. *Deutsche med. Wochenschr.*, No. 6, 1903.

50. **Panse.** On the technique of exposing the jugular bulb. *A. f. O.*, vol. 60, p. 33.

41. **MILLIGAN** suggests that, before an operation for cerebellar abscess is undertaken, lumbar puncture and the withdrawal of a varying amount of cerebro-spinal fluid should be performed, in order to diminish the risk of failure of respiration from paralysis of the respiratory centre due to pressure.

ARTHUR CHEATLE.

42. After death green pus was found in both middle ears, in several abscesses in the lungs, and in a large abscess of the spinal meninges. From this pus the bacillus was grown in pure culture.

ARTHUR CHEATLE.

43. **EMERY** relates three cases of basal meningitis in which he discovered a new pathogenic bacterium in the meninges and in the middle ear. He thinks the ears were secondarily affected. He reserves a full account of the organism until its character has been fully investigated.

ARTHUR CHEATLE.

44. The abscess, which was on the left side, was found to be draining into the antrum. From three to five ounces of pus escaped on opening. The difficulty with words disappeared a few days after the operation.

ARTHUR CHEATLE.

45. A boy, three years of age, suffered from scarlet fever with an otorrhœa on the left side. In the fourth week the suppuration became profuse with rise of temperature; the middle-ear cavities were opened. Pus was observed to escape from a fistula in the roof of the tympanum. An abscess as large as a hen's

egg in the left temporal lobe was then exposed and evacuated. The abscess cavity was closed on the ninth day. After the twelfth day the temperature was normal. The post-aural plastic step was performed five weeks later. Recovery after seven weeks. There were no symptoms except changes in the eye-grounds. SACHER.

46. Report of the case-histories of two children in whom a tuberculous meningitis developed immediately after an acute otitis. The author regards the otitis as the inciting factor in the causation of the tuberculous meningitis. BRUEHL.

47. A picture of otitic diseases of the meninges is given, based on a large number of personal observations and from literature. The statistics, the anatomical relationships, the passages of extension, the external pachymeningitis, and extradural abscesses are discussed. These clinical pictures are illustrated with carefully reported case-histories. BRUEHL.

48. Two cases of otitic pyæmia are reported, one with, the other without, sinus thrombosis. The former is interesting on account of the presence of a peribulbar abscess in the vascular sheath of the jugular vein, with the formation of a parietal thrombus in the jugular vein, which showed a distinct tendency to organization. In both cases, by means of agglutination, it was shown that a proteus cultivated from the pus from the ear was the cause for the general infection, and the otitic origin of the pyæmia was assured. This organism has always been regarded as a harmless saprophyte. The author is the first to draw attention to the importance of agglutination to demonstrate the otitic infection. HAENEL.

49. Relapsing otitis media, opening of the mastoid process, profuse venous hemorrhage, apparently from a large mastoid vein. Then meningeal symptoms, pyæmic temperature curve. Eight days after the first operation lumbar puncture was negative, and the jugular vein was ligated and the sinus exposed. The sigmoid sinus was empty, closed at both extremities by a thrombus. At the entrance of the mastoid vein there was a circular opening in the sinus. The pyæmic temperature continued. Six days later the jugular bulb was exposed after the method of Grunert. Then the temperature gradually dropped for three days, then another pyæmic attack, followed by convalescence. The facial nerve was at first slightly paretic, later normal. STREIT

is of opinion that the facial nerve cannot always be protected in peculiarly unfavorable anatomic conditions. If unfavorable conditions are present, it is necessary to leave the external margin of the jugular foramen. Even then the jugular bulb is sufficiently exposed.
HAENEL.

50. After experiments on the cadaver, PANSE suggests, in order to avoid injury to the facial in exposing the jugular bulb, that the facial nerve be first exposed in its vertical course and then displaced out of its canal.
HAENEL.

d.—OTHER MIDDLE-EAR DISEASES.

51. Connal. The treatment of dulness of hearing and subjective noises in the ears by high-frequency currents. *Journ. of Laryngol.*, Aug., 1904.

52. Mackenzie. A case of deafness, following on nasal obstruction without other disease of the hearing apparatus. *Journ. of Laryngol.*, June, 1904.

53. Watson. Pathogenesis of deafness due to chronic non-suppurative middle-ear disease. *Lancet*, Jan. 9, 1904.

54. Turner. A case of extensive osteo-myelitis of the temporal bone not involving the middle ear. *Lancet*, Jan. 2, 1904, Edinburgh Medico-Chir. Society.

55. Stroem. On a supramastoid cranial pneumatocele. *Nord. med. Arkiv*, 1902, I. Abt., H. 2, No. 8.

56. Stern. Immobility of the stapes in the oval window. Wiesbaden, bei Bergmann, 1903.

57. Habermann. On the pathology of the so-called otosclerosis. *A. f. O.*, vol. lx., p. 37.

58. Royer. Adhesions of the Eustachian tube to the posterior pharyngeal wall as a cause for progressive sclerosing otitis and symptoms of vertigo. *Arch. internat. d'otol.*, 1904, p. 371.

59. Stefanowaki. Myringotomy as a means of improving the hearing in chronic aural catarrh. *Wratschebnaja Gazeta*, 1904, No. 8, p. 9.

51. In all the cases described, ordinary treatment had been tried and found ineffectual. Dr. Riddell carried out the electrical treatment; he found that the effleuve method was unsatisfactory so he placed a condenser electrode in each ear. Results:

(1) Six chronic dry catarrh with secondary labyrinthine involvement. No improvement in any, but two thought the tinnitus was less.

(2) Fourteen chronic dry catarrh. Ten with tinnitus, which was much better in two and improved in eight.

Two in which a fractional improvement in hearing was noted.

(3) Seven post-suppurative condition.

Five with tinnitus, which was much better in four. In four there was a fractional improvement in hearing.

(4) Five sclerosis. In all, improvement in hearing, but slight in one; tinnitus improved in all.

In all groups the greatest benefit was obtained in the subjective noises. Apart from types, seventeen out of twenty-six complaining of tinnitus were improved.

ARTHUR CHEATLE.

52. A man, aged twenty-four, attended for deafness. Five months previously his nose had been cauterized elsewhere because he had difficulty of breathing through it on cold. After this treatment the obstruction became almost complete and he became very deaf, the hearing having been normal previously.

On examination both passages were closed by adhesion of the external walls to the septum. The drums were somewhat indrawn. The fauces, pharynx, and naso-pharynx were healthy. After removal of the nasal obstruction the hearing returned.

ARTHUR CHEATLE.

53. WATSON thinks that a closer and more systematic study of cases of deafness due to chronic, non-suppurative middle-ear disease, will lead to a reversal of the opinion generally held as to the absence of clinical indication of catarrh in the group of cases variously described as sclerosis of the middle ear, atrophic catarrh, otosclerosis, etc.

ARTHUR CHEATLE.

In two hundred cases of the disease, he has not seen a single instance where there has not been either (1) a clear history of frequently recurring "colds in the head," of a slight or severe nature, or (2) in those patients who definitely stated that they were not subject to colds, unequivocal evidence of an intercurrent naso-pharyngeal catarrh. He thinks that the condition found in the various forms of chronic non-suppurative middle-ear disease are different stages of one disease. He has examined three cases of deafness in dogs, using two in which the hearing was normal, as controls.

The Eustachian tubes of the deaf dogs showed distinct evidence of catarrh, the tympanic membranes were more opaque than normal, the mobility of the membrane and ossicles was impaired, the density of the temporal bone was increased, and the lining membrane of the tympanic bulla was extensively congested and thickened. A histological examination of the tympanic mucous membrane and of the lining membrane of the

bullae showed marked thickening (sclerosis) with increased vascularity. He thinks that it is conceivable that the chronic forms of inflammation may be induced by the attenuated activity of organisms which cause acute otitis media. CHEATLE.

54. TURNER showed a girl, aged twelve, who had never had middle-ear disease, and in whom the membrane was intact and the hearing normal. A gradually increasing swelling formed behind the right ear, the bone felt distended, and the skin became discolored. On incising the skin, extensive disease of the mastoid region was found extending to the lower part of the squamous portion and the occipital bone. The osseous tissue was full of pus and granulation tissue.

No evidence of tubercle, but pneumococci were found in the sputum. CHEATLE.

55. A young man, nineteen years of age, had otitis when he was eleven, which was not treated. This was followed by no symptoms except some deafness. For a half-year there has been a gradually increasing swelling over the left ear, involving the greater part of the temporal region and the mastoid process, in the centre with the consistence of an air cushion, hard at the edges. Beyond the ear, it is possible to feel through the firm bony wall a broad fissure 1 cm wide, with irregular toothed margins. The swelling is not tender. On deep pressure, tinnitus is produced. Tympanic percussion note. The swelling cannot be diminished by pressure, and is not influenced by Valsalva's experiment or by the catheter. The drum is normal, hearing good. At operation, a bone lamella, as thin as paper, was found connected with the surface of the skull by peculiar stalactite-like formation, $\frac{1}{4}$ to 1 cm high. In the fissure, these peculiar structures do not quite approach the bony lamella and form slight prominences. A true fissure is not present. The lamella is extirpated. The bone in the mastoid process is distended and contains large pneumatic spaces, which communicate with one another. There is no direct communication with the tympanum. Recovery without event. No relapse after two years. MOELLER.

56. The causes of stapes-ankylosis may be subdivided as follows:

A. Primary diseases leading to ankylosis of the stapes (ankylosis vera):

(1) Sclerotic catarrh of the tympanic mucous membrane.

(2) Circumscribed periostitis about the stapes.

(3) Primary diseases of the bony labyrinth capsule, "otosclerosis," "capsulitis," and "spongiosis" of the labyrinth capsule.

(4) Primary calcification or ossification of the annular ligament.

(5) Primary hypertrophy of the cartilaginous covering of the stapes plate, or of the margin of the niche.

(6) General hyperostosis of the temporal bone, with obstruction of the plate or the branches of the stapes by the surrounding osseous proliferation.

B. Secondary ankylosis of the stapes, following secretory middle-ear catarrhs:

(1) Through thickening of the mucous membrane or of the periosteum in the niche of the oval window.

(2) By connective-tissue strands and bands, partly the remnants of foetal conditions.

C. Temporary fixation of the stapes from excessive retraction of the drum in occlusion of the tube.

After an examination of the material in Bloch's clinic, the author concludes that stapes ankylosis is frequently a secondary symptom of a previous disease of the labyrinth capsule, and that the disease is generally bilateral. Of great importance for diagnosis is Gellé's experiment, the value of which has not been sufficiently appreciated.

HOELSCHER.

57. An extensive and illustrated report of the results of examination in twelve temporal bones from seven patients. The disease consists in an osteitis of the labyrinth capsule, occurring between the twentieth and the fortieth year. It increases usually in the form of two or three isolated foci from the periosteum along the blood-vessels into the bone. In the depth of the bone the process extends, while there are but slight changes in the surface of the bone. Usually the area surrounding the oval as well as the round window is affected. In the subsequent course the window membranes as well as the stapes may be infected. The membranous labyrinth usually remains intact. The endosteum may be thickened or calcified. All stages of the osteitis may be encountered side by side: absorption of bone with development of vessels, retrogression of vessels, new formation of bone, which, however, can always be distinguished easily from the normal bone. HABERMANN regards the sclerosis as a specifi-

cally syphilitic disease, and for the following reasons: It frequently occurs in persons affected with syphilis; it appears at a time when syphilis is frequently acquired; the similarity of the histological condition with syphilitic processes in bone; the symptoms—deafness, subjective noises, and vertigo—depend upon the site of the morbid areas; obstruction of the niches and stapes-ankylosis can be produced by catarrhal inflammations of the tube and of the tympanum, also by certain middle-ear diseases which do not lead to a perforation of the drum. These forms must be separated from the true sclerosis, both on pathologic grounds as well as from the course of the disease. The treatment of syphilitic sclerosis must be an anti-syphilitic one; mechanical methods of treatment to counteract rigidity of the sound-conducting apparatus should be tried. HAENEL.

58. According to ROYER, the cause for progressive deafness consists in broad adhesions of the pharyngeal opening of the Eustachian tube to the posterior pharyngeal wall. After division of these adhesions with the finger, the author believes that he has observed cases of recovery, improvement, or at least stationary deafness. OPPIKOFER.

59. The author comes to the following conclusions on sixteen cases: 1. Myringotomy is easily performed without pain and without danger. It should, therefore, be frequently undertaken to improve hearing and diminish tinnitus. 2. In 62.5 %, myringotomy improved the hearing, in 12.5 % of these almost complete recovery. 3. In all cases the noises were diminished or relieved. 4. The operation had a similar effect on the vertigo; the attacks were less frequent and less intense; vomiting and nausea disappeared. 5. The result is quicker the earlier the operation is undertaken. 6. In all cases the operation was easily performed without unpleasant incidents or complications. 7. The opening did not close in any case. SACHER.

NERVOUS APPARATUS.

60. Lake. Removal of the semicircular canals in a case of unilateral aural vertigo. *The Lancet*, June 4, 1904.

61. Wallace and Mariage. A case of attempted division of the eighth nerve within the skull for the relief of tinnitus. *The Lancet*, April 30, 1904.

62. Fuchs. A case of so-called idiopathic chronic internal hydrocephalus (in an adult); a contribution to the study of objective tinnitus. (Arbeiten aus dem Institut für Anatomie und Physiologie des Zentralnervensystems an der Wiener Universität.)

63. Urbantschitsch. On disturbances of writing and speaking as well as paralysis of the upper and lower extremities originating in the sensory nerves of the head. *D. Z. f. Nervenheilk.*, xxvi.

64. Okounneff. Involuntary movements of the head as the expression of an isolated affection of one of the semicircular canals in man. *Archiv internat. d'otol.*, etc., 1904, p. 345.

60. A highly important and interesting case is related by LAKE. A woman, aged twenty-one years, has been the subject of vertigo, vomiting, and gradually increasing deafness and tinnitus for five years. Ordinary treatment was of no avail. On February 16, 1904, the ordinary radical operation was performed with the exception that the innermost portion of the "bridge" was not removed, but the bony opening in the temporal bone was enlarged forwards, upwards, and backwards. The malleus and incus were removed. The semicircular canals were cut away with the burr. For forty-eight hours after, the patient lay coiled up on the right side, with the thighs flexed on the abdomen and the legs on the thighs. The eyes were closed, but on raising the lids, the eyeballs were seen to move in irregular rhythmical movements upwards and downwards and laterally. On the seventh day she sat up; on the tenth she was able to walk with assistance for a few steps, and after four weeks she was able to do anything without fear of falling to the right side whenever she turned to the left. At the end of fourteen weeks there had been no return of vertigo, but the tinnitus was just the same as before the operation. The hearing power was markedly increased. The voice, which had only been heard before at a distance of two feet, was well heard at five feet. The tuning-fork tests before and after are given.

ARTHUR CHEATLE.

61. A female, aged twenty-three, having had several operations for chronic suppuration of the left middle-ear developed giddiness and tinnitus one year after healing had occurred. The tinnitus was entirely confined to the left side and resembled the rushing of water or the sound of bells, being worse at night, especially if she lay on the left side. The tinnitus prevented sleep, and even with hypnotics the sleep was disturbed. When giddy, the ground seemed to rise towards her face. Her general condition became so bad that, as every treatment failed to give relief, Mr. WALLACE decided to divide the auditory nerve as it entered the internal auditory meatus. On September 3, 1903, the old wound was opened up and a horizontal incision backward was

made for one inch at its centre. The previous removal of bone rendered much more removal unnecessary; however, in removing bone at the lower part free bleeding occurred, which necessitated plugging and the postponement of further operation.

On September 10th, the sinus was found full of clot and projected so far forwards that it was divided between ligatures.

The anterior border of the exposed dura mater was incised in a somewhat curved manner for about one inch. A flat bent retractor was then introduced and an attempt made to expose the nerve by slowly pressing the cerebellum backwards. The continual flow of cerebro-spinal fluid and the free bleeding from the surface of the cerebellum hindered proceedings. After much difficulty a view of the nerve was obtained, and by means of a blunt hook the auditory nerve was pushed aside and the facial exposed. The hook was then turned through a right angle and passed behind the auditory nerve which by traction was divided. On September 11th, there was no facial paralysis and the tinnitus had greatly subsided. There was considerable giddiness on raising the head, and headache, with flow of cerebro-spinal fluid. Death occurred on October 1st, twenty-one days after the division of the nerve. At the post-mortem there was no sign of meningitis. The auditory nerve was found divided with the exception of a strand as thick as a fine piece of cotton and lying next the facial nerve. The lower half of the pons Varolii and the entire medulla oblongata was examined by Farquhar Buzzard. His report is too long for insertion here, but the vestibular nerve was found completely degenerated and about two-thirds of the cochlear.

ARTHUR CHEATLE.

62. The patient, a woman, thirty years of age, suffered at least three years from headache which at times became so severe that she became almost insane. These severe attacks, however, never lasted long, and the patient was able to follow her calling of delivering newspapers with brief interruptions. Tinnitus existed for three years. This was so severe that the relatives of the patient could perceive it. The noise in the head developed suddenly overnight. On examination December 12, 1902, there was a slight thyroid tumor, moderate exophthalmos, and bilateral choked disk.

Ear.—Drumheads both normal; tuning-fork perception for air moderately diminished, for bone normal; Weber uncertain, Rinne positive on both sides. Whisper was heard at 4½m.

The skull showed no abnormality. On auscultating the skull, in all places a distinct pulsating, blowing noise could be heard continuously, appearing loudest in the proximity of the right ear and in the right auditory canal. On pressing the right carotid artery, the noise ceases, to return on relaxing the pressure. During compression, the hearing for whisper increased up to 8m, and the tuning-fork could be heard longer than before.

Diagnosis.—Endocranial aneurism of the right internal carotid in or near its canal.

The condition of the patient remained about the same up to June, 1903, then she became worse. The sight in the right eye failed first, then occasional vertigo, and since the beginning of July during the attacks she vomited. From July 10th incontinence of urine and fæces, increase of the head noises, especially in the right ear, severe occipital headache. The patient usually rested on her right side.

She was admitted to the clinic, July 25, 1903. On further examination, there was no ocular paralysis. The disks were well-defined, no paralysis, no convulsions, no fever. The noise can be heard on approaching the ear within 1-2mm from the right temple. It can no longer be controlled by compression of the carotid.

She was somewhat relieved by morphin and ice, then suddenly at night while talking to her neighbor death ensued.

Autopsy.—Chronic internal hydrocephalus with granulations on the ependyma and chronic cerebral œdema. The cerebral convolutions were flattened. The plexus of the fourth ventricle was thickened and adherent. Chronic pulmonary tuberculosis at the left apex, œdema of the lungs, hyperæmia of the liver and of the kidneys.

Microscopic examination showed in the parietal region of the brain a distinct round-celled infiltration of the periosteum. This extended along the blood-vessels deep into the cortex, which was unusually hyperæmic. In several areas the plexus also presented a round-celled infiltration. Otherwise even the left labyrinth was normal. There was no thickening of the carotid in the carotid canal.

The case was consequently one of leptomeningitis for which neither the cause nor clinical evidence could be furnished.

In discussing the cases of a noise which could be controlled by compressing the carotid artery, and where the diagnosis was made of an endocranial aneurism, without autopsy, the author

believes that in a number of similar cases cerebral symptoms were present. Choked disk is not in favor of the diagnosis of aneurism.

A definite explanation for the noise and its localization in the aural region is not possible. Perhaps the cause was a general one, a diffuse stenosis of the vessels. The noise could then have been produced by the compression of the vessels by the brain.

HOELSCHER.

63. The author discusses reflex paralyses of the upper and lower extremities of otitic origin (transient paresis in tubal catarrh, packing after the radical operation), the disturbances of writing produced reflexly from the ear (poor writing after the onset of ear disease occurring in fifty patients after packing of the ear and alteration of writing in eleven), then the reflex paresis of the muscles of articulation and the consecutive disturbance of speech (the difficult speech during the middle-ear catarrh, packing of the auditory canal, amnesic aphasia in middle-ear inflammation). The paper concludes with a description of the combined appearance of various reflex paralyses in ear diseases, and the influence of packing introduced into the ear has on sensations of taste and temperature, and finally asthenopia in ear diseases.

BRUEHL.

64. CASE 1.—The case of a man with left-sided otorrhœa existing since childhood. On admission, severe left-sided headache, rise of temperature to 38.5° C., profuse otorrhœa, swelling, and redness of the skin over the left mastoid process. After a few days, continuous rhythmic movements of the head in a direction from behind forwards and from right to left. On affixing the finger of the physician the movement of the head continued, and vertigo and a tendency to fall forward set in. The diagnosis was made of a one-sided disease of the semicircular canal, and curiously enough a conservative treatment was adopted consisting in irrigation, warm compresses, leeches, instillations of iodid of potash and calomel. Notwithstanding, recovery after six weeks.

CASE 2.—This is also supposed to be a case of isolated disease of the semicircular canal. From the case-history it is not quite clear whether the movements of the trunk and of the head, which have existed for two years, are the symptoms of a general affection. The fact that the patient was deaf in both ears and that after the application of a blister on the mastoid process the trembling movements of the head were reduced from 120 to 40 does

not suffice to establish the connection between the tremor of the head and of the trunk with the disease of the semicircular canal. In addition, the drum membranes were normal, and bromid, arsenic, and iodid of potash were administered.

OPPIKOFEK.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

65. Réthi. So-called nasal reflexes. *M. f. O.*, 1904, No. 1.
66. Bukofzer. On the nasal reflex neurosis of the fifth nerve and a substitute for the diagnostic experiment with cocaine. *Arch. f. Laryngol.*, vol. xiv., No. 3.
67. Belogolowow. On the influence of impeded nasal respiration on the morphology of the blood and the processes of oxidation. *Dissertation*, St. Petersburg, 1903.
68. Gellé. On the nasal cause for lachrymation. *Arch. internat. d'otol.*, etc., 1904, p. 8.

65. After a lecture of Urbantschitsch's on paralyses of the upper and lower extremities and disturbances of writing and speaking after disease of the middle ear, the author reports on three cases in which packing introduced into the nose in one case produced a paresis of the right leg, and in two cases attacks of vertigo, which symptoms all disappeared after the removal of the tampon. Opposed to Urbantschitsch's view that these are reflexes, the author suggests the possibility that disturbances of the circulation and obstructed flow of blood and lymph from the cranial cavity may be the cause for these symptoms.

PIFFL.

66. A woman, forty-five years of age, had suffered from pain in the head for two years, then pain in the right side of the face radiating to the right ear, with attacks of deafness. The ear was examined and showed a moderate loss of hearing. The mouth could only be opened a few *mm*. Pressure on the supra-orbital foramen and canine fossa was painful. The nose presented a spur on the right side which was not in contact with the lower turbinal. The ankylosis of the jaw was probably due to muscular spasm, showing involvement of the motor sphere of the third branch of the fifth nerve, which also accounts for the increased deafness (contraction of the tensor tympani muscle). On touching the spur no symptoms resulted, but on applying an adrenaline solution the pain disappeared and the mouth could be opened.

This shows that the cocaine experiment can be replaced by the adrenaline solution. After removal of the spur the pain in the face and in the ear disappeared, mastication was again possible. A small mycotic plug was situated in the right tonsil. After removing this the sensation of a foreign body was relieved. According to the author, the spur was the primary and the plug the accidental cause for the trigeminal neurosis. Another case was then mentioned in which the restraining action of adrenaline was clearly marked. A convulsive tic in a girl fourteen years of age ceased after painting the nasal mucosa with a solution of adrenaline 1:2000.

ALBANUS.

67. The question was approached by examining patients with various diseases of the nose which impeded respiration, and animals in which fluid vaseline had been injected into the nose, which on becoming cold made nasal respiration impossible. In animals this produced emphysema of the upper parts of the lungs, the oxidative power was diminished one half, and venous stasis was produced. In man the hæmoglobin of the blood was lowered five to ten per cent., and the number of red blood corpuscles diminished, and the leucocytes of medium grade developed; the evolution of the white blood corpuscles was retarded, the eosinophyles not increased. All these symptoms were especially marked in young individuals, varying in age from five to sixteen, and appeared in proportion to the duration and intensity of the nasal obstruction.

SACHER.

68. One hundred patients suffering from lachrymation were examined rhinoscopically. In fifty the nose was normal; in the other fifty pathological changes were present (hypertrophic rhinitis in nineteen). According to the author, epiphora is exceptionally the result of a simple mechanical obstruction of the nasal orifice of the lachrymal duct. It is much more apt to be an infection extending from the nose to the lachrymal canal and lachrymal sac. This would explain why in not one of the nineteen cases of hypertrophic rhinitis the epiphora was cured after the nasal condition was corrected.

OPPIKOFEK.

b.—SEPTUM.

69. Kretschmann. On deviation of the anterior half of the nasal septum. *Arch. f. Laryngol.*, vol. xiv., No. 3.

70. Félix. Perforations of the nasal septum in syphilis. *La semaine médicale*, 1904, p. 41.

69. The nasal alæ are drawn up and out by muscular action, the resiliency of the cartilage brings them back not quite into position. Instead of subdivisions into a mobile and cutaneous septum, the author recommends the subdivision into an anterior or triangular septum, a middle or quadrilateral or cartilaginous septum, and a posterior or bony septum. Displacement of the quadrilateral cartilage out of the median line leads to a dislocation of the margin of the cartilage in the incisive sulcus, which may exist alone or be associated with a rotation of the quadrilateral cartilage on its vertical axis when the opposite side often presents a spur.

Dislocations of the quadrilateral cartilage produce changes in the position of the tip of the nose and of the dorsum. A dislocation can be aggravated through attraction from the inspiratory current. Dislocations which are not fixed can be corrected and retained in the corrected position by rubber tubes. This will result in recovery. This manœuvre is especially suited for children and youthful individuals. In adults the treatment fails on account of the impossibility of reposition.

ALBANUS.

70. FÉLIX examined 43 persons suffering from tertiary syphilis. In 6 there was a perforation in the nasal septum. In 12 patients with tertiary syphilis of the upper respiratory passages this condition was present in 7. The perforation of the nasal septum consequently can be regarded as occurring frequently in tertiary syphilis. The author, however, warns us from regarding all perforations of the septum as syphilitic, and recites all the other well-known causes that can produce a perforation.

OPPIKOFER.

C.—OZÆNA.

71. Roques. The treatment of ozæna with collargol. *Arch. internat. d'otol.*, etc., 1904, p. 130.

72. Fliess. The treatment of ozæna with injections of hard paraffin. *Berl. klin. Wochenschr.*, 1904, No. 10.

71. Four cases are reported to show the curative effects of insufflations of collargol 0.4, milk sugar 10. After irrigating and cleansing the nose, the powder is insufflated twice a day for the first ten days and then only once a day.

OPPIKOFER.

72. A short report of 12 cases in which 32 injections were made in the lower turbinal and in the nasal septum. In all cases

this treatment resulted in an improvement greater than that resulting from any other previously tried method of treatment.

MUELLER.

d.—TUMORS.

73. Kaiser. The treatment of malignant tumors with secondary rays. *Wiener klin. Rundschau*, No. 12, 1904.

74. Hajek. On relapses of nasal polypi. *Arch. f. Laryngol.*, vol. xiv., No. 38.

73. The author first describes the secondary rays and the proof of their existence and shows that it is possible with secondary rays to make very much longer exposures than with the direct X-rays.

The apparatus consists of a metallic funnel. At one end there is a rubber tube which furnishes the secondary rays and which is introduced directly into the bodily cavity. As a proof of the action of secondary rays, a case is reported which had been previously operated upon four times; in an interval of three months continuous relapses with complete occlusion of the nose with tumor masses and spindle-celled sarcoma. After the operation the area was treated for from 15 to 45 minutes. As there was no inflammatory reaction, the period of treatment was prolonged to two hours. Recovery.

WANNER.

74. A cause for the recurrence of polypi may be found in the polypoid degeneration of the lining of the accessory cavities. This is the opinion of the author after having observed a case of one-sided nasal polypi where after thorough removal of the polypi a sudden relapse always occurred, arising first in the ethmoid and then in the maxillary antrum. In both of these cavities, operation revealed polypi and degeneration of the mucous membrane without empyema. Recovery took place. It was unusual to note the absence of inflammatory changes in the nasal covering of the ethmoid and the transformation of the entire labyrinth into one cavity without previous suppuration. The perforation of the polypi from the maxillary antrum into the nose is explained by increased pressure within the maxillary antrum from inflammatory changes with increase of discharge.

ALBANUS.

e.—DISEASES OF THE ACCESSORY CAVITIES.

75. Roth. On a previously not reported form of exudate in inflammation of the maxillary antrum. *Wiener med. Presse*, No. 3, 1904.

76. Strubell. On the statistics of diseases of the accessory cavities. *Arch. f. Laryngol.*, vol. xiv., No. 3.
77. Stein. On opening into the maxillary sinus. *Chirurgija*, Oct., 1903.
78. Cumston. Some remarks on dentigerous cysts. *Revue de Chirurgie*, 1904, p. 31.
79. Lasarew. On ethmoidal empyema. *Chirurgija*, Nov., 1903.
80. Sassedatelew. A remarkable anomaly of the ethmoidal labyrinth. *Chirurgija*, vol. xiii., No. 77.
81. Juergens. A case of ozæna with fatal termination. *St. Petersburger med. Wochenschr.*, 1904, No. 4.
82. Laurens. Surgery of the sphenoid. *Arch. internat. d'otol.*, etc., 1904, p. 81.
83. Thiele. On Killian's radical operation for chronic suppuration of the frontal sinus. *Arch. f. Laryngol.*, vol. xiv., No. 3.
84. Stella. The radical cure of chronic suppurations of the frontal and ethmoidal sinuses. *La presse oto-laryngologique Belge*, No. 4, 1904.
85. Fetterolf. Cardiac inhibition through irritation of the peripheral fibres of the 5th nerve in the course of an operation for chronic empyema of the frontal sinus. *American Medicine*, Mar. 19, 1904.
86. Toubert. Some remarks on the method of healing of chronic frontal sinusitis after the radical operation. *Arch. internat. d'otol.*, etc., 1904, p. 398.
87. Fernandes and van Swieten. Nine cases of chronic frontal suppuration operated upon according to the method of Goris. *La presse oto-laryngologique Belge*, No. 3.

75. According to the author, there are unquestionably cases in which the mucous membrane is diseased without any discharge. After irrigation, the previously existing severe pain ceases. Five cases are reported, two acute and three chronic, in which, notwithstanding existing inflammations of the mucous membrane of the antrum, there was no obstruction for the escape of the secretion into the nose. Notwithstanding, there never was any discharge either in the middle meatus or in the retro-nasal cavity. Tenacious discharge is unquestionably characteristic in these cases, which are no doubt the result of a catarrhal inflammation of the mucous membrane. The entire mass of the discharge coheres, so that it cannot flow out of the nose nor be removed by blowing the nose. Rhinoscopically there is no discharge to be seen in the nose nor in the retro-nasal space. It can only be evacuated by irrigating with considerable force. The discharge is greenish, collected in a large lump, and appears as if surrounded by a skin. On account of these cases, the author demands that in cases of occlusion of the nose where no mechanical cause can be found, or where one continues to exist after treatment, though discharge is not present, the antrum be

examined. This also holds good for the cases in which there is pain in the region of the superior maxillary or the region of the teeth with discharge from the nose or epiphora.

WERNER.

76. This is a statistical report on the diseases of the accessory sinuses from Chiari's clinic, in which the difficulties and importance of the subject are fully considered. The great number of empyemata of the frontal sinuses is unusual. ALBANUS.

77. A series of pictures of the maxillary sinus show that the cavity can best be opened from the alveolus of the second molar tooth. SACHER.

78. Six cases of maxillary cysts. The author favors the theory of Malassez as regards their origin. OPPIKOFEK.

79. In two cases, the suppurative process in the lachrymal sac produced a disease of the ethmoid after an involvement of the thin lachrymal bone. SACHER.

80. Posterior to a normally developed frontal sinus there was a second cavity of the same size lined with mucous membrane belonging to the ethmoid, which did not communicate with the frontal sinus, and extended in the roof of the orbit up to the optic foramen. SACHER.

81. The cause of death was a purulent basilar meningitis, which resulted from an extension of an infection from the ethmoid cells. The pus in this case had taken its origin from the purulent collections in the ulcerated mucous membrane. SACHER.

82. After an anatomical introduction, the various methods of operating the sphenoid cavities are reported. The article brings nothing new. OPPIKOFEK.

83. Report of six case-histories of patients operated upon according to Killian's operation. Four of these were successful. In two, a previous operation had been performed and the scars made at that time are now the most noticeable. In one, complete recovery did not take place, and afterwards irrigation of the cavities was undertaken. In one case, death resulted from meningitis. As autopsy was not permitted, it is uncertain whether an old abscess of the frontal lobe or an extradural abscess was present, which was made active by the operation, or an injury of the meninges had taken place at operation, or that the infection had spread by the lymphatics. In no case was there diplopia,

and no affection of the iris on prophylactic use of atropin. In the first two cases, drainage from the inner angle of the wound; later, a drain was introduced from the nose into the frontal region. The formation of a flap from the nasal mucous membrane was at first difficult; in the latter two cases, perfectly satisfactory. It was possible to overlook the large operative field, and the author regards this operation as a distinct advance in the treatment of chronic frontal-sinus diseases. ALBANUS.

84. According to STELLA, the Luc operation is apt to be followed by relapses, especially in chronic suppurations of the frontal sinus with disease of the bony walls, and when complicated with disease of the ethmoidal cells. The author has made use of the procedure described by Jacques and Durand, in No. 8 of the *Annales des maladies de l'oreille*, August, 1903, and reports three cases. A complete exposure of the frontal sinus is possible; disinfection and curetting are facilitated. The ethmoidal cells can be directly treated; there is no deformity and no relapse. BRANDT.

85. During an operation for a chronic empyema of the right frontal sinus in a man thirty-five years of age, reflex cardiac inhibition from the fifth nerve occurred. Every time the curette touched the sinus wall there was a distinct diminution in the force, fulness, and rapidity of the pulse with simultaneous cyanosis. Curetting had, therefore, to be frequently interrupted. This phenomenon has been observed after extractions of teeth, and a similar reflex has been observed at operations in those regions of the ear which are supplied by the trigeminus. TOEPLITZ.

86. An isolated form of frontal sinus suppuration which has existed for only a few months. The Ogston-Luc operation is recommended. If the frontal-sinus empyema is complicated with suppurations in the ethmoidal cells the procedure of Jacques, Killian, or Kuhnt is advised. ÖPPIKOFER.

87. This is a report of nine cases which have been operated upon according to the procedure of Dr. Goris. The short length of after-treatment is unusual. The patient returned home after eight to ten days and without a bandage. There were no relapses, and the cosmetic result is excellent. BRANDT.

f.—OTHER DISEASES OF THE NOSE.

88. Veyrassat. A case of dislocation of the nasal bones. *Revue médic. de la Suisse romande*, 1904, p. 55.

89. Réthi. On the treatment of epistaxis. *Wiener med. Wochenschr.*, No. 11, 1904.

90. Navratil. A new procedure to correct synechia in the nose. *Arch. f. Laryngol.*, vol. xiv., No. 3.

91. Mohr. On the treatment and prevention of hay-fever. *Deutsche med. Wochenschr.*, No. 4, 1904.

92. Lubbert and Prausnitz. On the serum treatment of hay-fever. *Berlin. klin. Wochenschr.*, 1904, Nos. 11 and 12.

93. Barth. A new case of rhino-scleroma in East Prussia. *Arch. f. Laryngol.*, vol. xiv., No. 3.

94. Strebel. A new method of treatment for lupus and malignant growths by means of molecular disintegration with continuous high-tension currents. *Deutsche med. Wochenschr.*, No. 2, 1904.

95. Gellé. Double syphilitic chancre in the nose and in the conjunctiva. *Arch. internat. d'otol.*, etc., 1904, p. 417.

88. A shoemaker, thirty-three years of age, received a blow on the left side of his nose with a wooden boot. Both nasal bones were dislocated to the right side. The deformity was easily reduced, no dressing applied. OPPIKOFER.

89. After describing the various methods of arresting hemorrhage which are familiar to all, a case of persistent epistaxis is reported in which the hemorrhage could not be arrested. The mucous membrane was curetted with a sharp spoon to an extent of a square *cm*, and trichloracetic acid was applied. The hemorrhage ceased. Similarly two cases were treated with success. Two of the patients suffered from arterio-sclerosis and one from cirrhosis of the liver. WANNER.

90. In a girl of fifteen the author divided the nose, excised the synechia, and transplanted skin grafts which adhered without packing. Recovery after ten days. ALBANUS.

91. MOHR has regularly suffered from hay-fever in the critical period for nine years, and has found that the symptoms of irritation in the beginning are distinctly diminished after the use of Dunbar's antitoxine, the so-called pollutin. He has had made for himself a small protective apparatus which enables him to undergo long journeys without fear of an attack. The apparatus consists of two funnel-shaped structures which are introduced into the nose and fit tight to the nasal orifices. In the funnels there is some thin cotton which forms a safeguard against the entrance of the pollen and can be easily changed. These funnels can be prepared after having taken a wax impression for each side of the nose, though the nasal separator of Schmidt-Hérison can be employed for this purpose. NOLTENIUS.

92. This is the first collective report on the practical experience which was gained during the last hay-fever season with Dunbar's serum. Two hundred and eighty-five patients were treated. Of these, the result was satisfactory in 60 %, partial in 29 %, no result in 11 %. The last number includes all the cases where the result was influenced by improper application or wrong indications. According to the author, only 1.4 % of the cases remain in which a cause for the ill-success was not determined. In any case the report shows that the pollantin in many, and in the most severe cases, exercises a specific action on hay-fever. The degree of this action is not at present fully determined on account of the comparatively few cases. The agent is obtainable in the form of liquid and dry pollantin. The latter appears to be most suited for treatment of the nose. It is especially important that the treatment should be begun before the height of the attack, namely, prophylactically in the morning before rising during the hay-fever period, and then at each onset of the slightest symptoms of irritation. The general rules, of course, should be followed. Exact directions and the necessary instructions are supplied with the agent. At the end of the article the favorable results are reported which have been obtained with the serum treatment of the American autumnal catarrh which is an analogon of our hay-fever.

MUELLER.

93. The author observed a farmer, forty-five years of age, in the neighborhood of the so-called scleroma district in East Prussia who had been admitted to the hospital on account of dyspnoea. After a bite by a horse a year ago, a tumor appeared in the right ala of the nose. The tumor was as large as a walnut, hard, and the overlying skin was dark blue. The nose was very narrow. The mucous membrane was brownish, thickened. The nasal entrance and pharyngeal wall were in the same condition. The configuration of the interior of the nose was lost. The epiglottis was thickened, stridulous breathing, subjective dyspnoea. The treatment consisted in a nasal spray and mechanical dilatation of the pharynx with success.

ALBANUS.

94. With a large induction apparatus and an especially constructed electrode, which is approached to 1 to 2mm from the lupus nodule, a continuous current is allowed to play from ten to twenty-five seconds. The affected tissue is so acted upon that on the day after, the nodule has become an ulcer which heals in a few weeks under applications of ointments. This method has

also been tried with success in lupus erythematosus. Attempts to employ this method in the treatment of malignant tumors have not been completed.

NOLTENIUS.

95. A young man, twenty-four years of age, noticed a foreign body in his right eye. A companion turned the upper eyelid and removed this particle with the aid of a small piece of cigarette paper which had been moistened with saliva. Two months later a primary lesion occurred on the inner surface of the right eyelid. As respiration through the right half of the nose was interfered with, an examination was made and another primary lesion was found in the mucous membrane of the cartilaginous septum, which was probably transmitted by the finger of the patient or through the tears.

OPPIKOFER.

g.—NASO-PHARYNX.

96. Zuckerkandl. On cartilage in the pharyngeal tonsil. *A. f. O.*, 1904, No. 2.

97. Potapow. The third tonsil in nurslings. *Russky Wratsch*, 1903, No. 49.

98. Okuniew. On removing adenoid tissue from the epipharynx, especially in ear diseases. *Wojenno-Medycinski Szurnal*, 1896, vol. clxxxvi., pp. 740-789.

99. Reinhard. On the presence of foreign bodies in the nose with adenoid vegetations. *A. f. O.*, vol. lx., p. 35.

100. Burger. Fatal hemorrhage after removal of adenoids. *La presse oto-laryngologique Belge*, 1904, No. 4.

101. Guye. Adenoid vegetations of the naso-pharynx. *Arch. internat. d'otol.*, etc., 1904, p. 186.

102. Zwillinger. On the relation of the hyperplastic pharyngeal tonsil to stuttering. *Wiener med. Wochenschr.*, No. 6, 1904.

103. Grossard. Stuttering and adenoid vegetations. *Arch. internat. d'otol.*, etc., 1904, p. 403.

96. Following Reitmann's article on the occurrence of cartilage in the pharyngeal tonsil, the author describes the microscopic examination of the pharyngeal tonsil in a lion, in which a great number of cartilaginous fragments of varying size were found present. Moreover, the tonsil tissue consisted of a connective-tissue plate, a superficial adenoid layer, and an intervening granular layer.

PIFFL.

97. The author claims that this affection occurs frequently in children, and recommends the early removal of the pharyngeal tonsil with the Gottstein curette under local anæsthesia, but never before the fourth month. Before operation the naso-pharynx should be cleansed by the frequent pouring into the nose of a solution of salt and soda.

SACHER.

98. The author recommends removing adenoid vegetations in various sittings with a cutting forceps. In many cases an immediate improvement of the hearing took place. In other cases where the vegetations were situated in the roof of the pharynx and about the tubal openings, the hearing was distinctly diminished after operation.

SACHER.

99. This simultaneous condition occurs frequently in children, and the foreign body in the nose is apparently of diagnostic importance for adenoids.

HAENEL.

100. BURGER lost a patient, aged eleven, from hemorrhage after removing adenoids. The child suffered from leukæmia. This disease is not mentioned in the literature as a cause for death on operation. The author since this unfortunate experience examines each child for symptoms of leukæmia. One child, which was recognized as suffering from leukæmia, was not operated upon and died five weeks later.

Severe hemorrhages after removal of adenoids are unusual. In the literature, the author was able to find reports of only 4. Of 78 hemorrhages, 14 were in patients more than fifteen years old; so that the danger of hemorrhage increases with age, which is probably due to the more resistant tissues. The time of onset of the hemorrhage varies. At operation, it occurred in 3 cases, two hours after operation in 19, six hours after in 3, twenty-four hours after in 4; 1 case bled on the second day, 5 on the fifth, 1 on the eighth, and 1 on the ninth. The instrument employed is apparently of little importance.

The causes for severe hemorrhage given in literature are, inflammations, menstruation, restlessness after operation, and traumatism. Burger regards the particles of adenoid tissue which remain as the most important sources for the hemorrhage.

BRANDT.

101. This paper was read at the Congress for Hygiene, in Brussels. GUYE pleads for an examination of the children in all of the schools in every land for the presence of adenoid vegetations.

OPPIKOFER.

102. In 28 % of the cases, adenoid vegetations were present. The author concludes:

(1) An association between adenoid vegetations and stuttering in the sense of cause and effect does not exist.

(2) Adenoid vegetations furnish a predisposing factor in the production of stuttering.

(3) After removal of adenoid vegetations, in rare cases the stuttering can be cured.

(4) Removal of adenoid vegetations is not neglected in every case of stuttering, otherwise the treatment would be of no avail.

WANNER.

103. Three cases of stuttering were immediately and completely cured on removal of the pharyngeal tonsil.

OPPIKOFER.

A.—PHARYNX AND MOUTH.

104. Blumenfeld. On the etiology and treatment of xerosis of the mucous membranes of the throat. *Arch. f. Laryngol.*, vol. xiv., No. 3.

105. Conrad. On the present state of our knowledge of Vincent's angina. *Arch. f. Laryngol.*, vol. xiv., No. 3.

106. Hertz. A case of acute pharyngeal tuberculosis in a child six years of age. *Arch. f. Laryngol.*, vol. xiv., No. 3.

107. Sokolowsky. On the relation of granular pharyngitis to tuberculosis. *Arch. f. Laryngol.*, vol. xiv., No. 3.

108. Trétop. The rôle of the tonsils in infections. *La presse oto-laryngologique Belge*, 1904, No. 4.

109. Henking. On severe hemorrhage after operation for hypertrophied tonsil. *St. Petersburg med. Wochenschr.*, No. 11, 1904.

110. Chaureau. Congenital perforation of the anterior pillars of the fauces. *Arch. internat. d'otol.*, etc., 1904, p. 556.

111. Sserapin. On mixed tumors of the palate. *Russdj Chirurgitscheskij Archiv*, 1903, No. 2.

104. The author describes the etiology and emphasizes the difference in climate between the cities on the Atlantic coast and on the other side of the ocean, and its importance for the upper respiratory passages. As to the importance of diabetes as a cause for xerosis, three cases are reported, which were observed in one year, where diabetes was diagnosticated from the condition in the throat. Hypertrophic forms of pharyngitis occur, according to the author, more frequently in gout, atrophic forms in chronic arthritic deformans. A case is then reported, which corresponds to the one described by Sticker as a metasyphilitic xerosis in the respiratory organs. Treatment: Sea climate; in the winter, islands of the Mediterranean. Local: iodipin, at the same time gargles and inhalations of salt springs. Twenty cases were treated with success by this method, with the exception of only four.

ALBANUS.

105. The author does not commit himself to the theory that the virulence of the bacillus has been increased by symbiosis

with the spirillum, because he found in one case of a relatively mild membranous form both bacilli and spirilla in equal numbers. In another case of severe ulcerous form, chiefly bacilli were found present. The etiology, differential diagnosis, and treatment are described. Three cases are related, with illustrations of their microscopic conditions. In one case, at the acme of the disease, a pure culture was found. Later, the bacilli and spirilla gradually diminished and the various bacteria found in the mouth appeared.

ALBANUS.

106. In the beginning, pain in the neck, dysphagia, fever. Diphtheria was diagnosed. Serum was injected with no improvement. Dysphagia, then cough, expectoration, and emaciation. Examination revealed many small ulcers on the uvula, soft palate, palatal arches, and posterior pharyngeal wall, which had taken the form of a large ulceration on the posterior pharyngeal wall. The uvula and the anterior palatal arches were swollen and covered with miliary tubercles. The epiglottis was swollen. Over the larynx, an increased respiratory murmur with crepitant râles could be heard. T. 38.2° C. Tuberculous bacilli were found in the discharge from the pharyngeal ulcers. Death after three months.

ALBANUS.

107. In thirty-four cases, granula of the pharynx and parts of the lateral folds were removed for microscopic examination. In eight of thirteen, with other signs of tuberculosis or lupus, the microscopic sections showed tuberculosis of the granula or of the lateral folds. In one case, the finding of tuberculosis in a granulum of the pharynx led to an examination which revealed incipient trouble at the apex of the lung. The form of tuberculous involvement of the granula or lateral folds corresponds to the latent form of tonsillar tuberculosis. The granula and lateral folds should be extirpated in some cases for diagnosis, in others as a prophylactic and therapeutic measure.

ALBANUS.

108. A child, fourteen years of age, belonging from constitution and family antecedents to the pre-tuberculous, was taken ill with a mild tonsillitis. After this, the cervical glands enlarged and broke down. The entire package of glands was extirpated and proved to be tuberculous. The tonsils consequently play a great rôle in infections. In their crypts all kinds of malignant bacteria are to be found; nephritis, colitis, etc., may follow febrile inflammations of the tonsils. It is very important that the mouth and the pharynx be properly cared for

during the various inflammations of this region. In individuals predisposed to recurring attacks of tonsillitis, the tonsils should be removed.

BRANDT.

109. In five cases the author observed severe hemorrhage after removal of hypertrophic tonsils. One peculiarity, which occurred in all cases, consisted in the fact that the hemorrhage came from the posterior palatal arch, which had been incised during the removal of the tonsil. This source of hemorrhage has not been regarded in books on surgery or on diseases of the throat. The tonsillotome seems to be more apt to cause an injury than the knife or the scissors. The very much feared injury to the internal carotid, according to the author, is practically impossible, if the operation be performed with moderate care. It must be acknowledged that hemorrhage may occur in a properly executed tonsillotomy from injury to the internal maxillary and lingual arteries when these vessels travel an anomalous course, though the literature does not describe any such accident. In a few cases, injury of the tonsillar artery has been followed by obstinate hemorrhages. The best and simplest method in a severe hemorrhage consists in pressing the bleeding area with the index finger introduced into the mouth of the patient. In severe hemorrhage, the carotid artery must be ligated.

SACHER.

110. CHAUREAU observed accidentally in a patient, aged thirty, with nasal polypi, a congenital defect in both anterior pillars of the palate. One perforation was like a fissure and the other oval.

OPPIKOFER.

111. A patient, female, thirty-eight years of age, has suffered for four years from a slightly movable tumor, as large as a hen's egg, attached to the hard palate. It was easily enucleated. Microscopic examination showed that the tumor belonged to the teratomata.

SACHER.

BOOK REVIEWS.

I.—**The Modern Mastoid Operation**, by F. WHITING, A.M., M.D., Professor of Otology, Cornell University Medical School, Aural Surgeon to the New York Eye and Ear Infirmary, etc. 353 pages, in quarto, illustrated with 25 half-tone plates. P. Blakiston's Sons & Co., Philadelphia, 1905. Price \$6.

This stately monograph is an exhaustive treatise on the operation for acute suppurative mastoiditis which the author recommends. After an historical introduction, the main part of the book is given up to the "complete modern mastoid operation." Every step from the preliminary preparation to the after-treatment is taken up in a chapter for itself. The descriptive text is illustrated by twenty-five admirable half-tone reproductions accompanied by key plates. The illustrations are both true to nature and artistic.

The chief points in Dr. Whiting's conception of the mastoid operation, beyond a complete ablation of the mastoid process, consists in adding a horizontal incision to the usual vertical cutaneous incision, and the systematic removal of the cells situated in the superior meatal wall (posterior root of the zygoma). Preceding the technical part, a chapter is devoted to the pathology of suppurative mastoiditis, and in conclusion the indications for the mastoid operation, with differential diagnosis, are added. This book, by an author who has been so active in the development or rather completion of the operation for acute mastoid disease, will be read and studied with interest and profit by all active aural surgeons, while for those of less experience the presentation of the anatomy, operative surgery, and pathology in a single volume will be of great value and convenience. A. K.

II.—**Die Operative Ausräumung des Bulbus Venae Jugularis** (The Operative Eradication of the Bulb of the Jugular Vein), by Prof. K. GRUNERT, of Halle a. S. Pp. 145. F. C. W. Vogel, Leipzig, 1904. Price 4 Marks (\$1).

Advance in the operative treatment of pyæmia of otitic origin has in recent years been directed to rendering the jugular bulb directly accessible to operation. This has been found necessary where the pyæmic manifestations have continued from a jugular-

bulb thrombosis, notwithstanding resection of the sigmoid sinus and ligation of the internal jugular vein. Methods of completely exposing the bulb of the jugular vein with cases have been previously described by Grunert, Stenger, Hinsberg, and Piffel.

Grunert in this monograph gives the histories of twelve personally observed cases from the Schwartz clinic and five of other authors where the jugular bulb was exposed and opened. Chapters on the anatomy of the jugular bulb, pathology of jugular-bulb thrombosis, diagnosis, and treatment follow. The operation is indicated when with continuation of severe pyæmic symptoms the disintegrated thrombus of the jugular bulb cannot be satisfactorily treated by manipulation from the sinus above, or the vein below, or by irrigation, and in certain forms of primary bulb thrombosis.

The operative purpose is to convert the sinus, bulb, and jugular vein into a continuous groove with a common external opening. The steps of the operation are as follows: After complete resection of the mastoid process and ligation of the internal jugular vein, the soft parts are strongly retracted from the base of the skull in the direction of the jugular foramen, the transverse process of the atlas, if unusually prominent, is resected, the insertion of the deep muscles detached, and finally the bony bridge (jugular process of the occipital bone) forming the boundary of the jugular foramen is broken through with the chisel and hammer without necessarily injuring the facial nerve. The bulb then lies exposed, its external wall can be excised, the thrombus masses removed, and the venous communications directly examined.

The author claims that this operation can always be performed, though with greater or less difficulty, according to the anatomical conditions, except perhaps in the presence of an unusually developed paracondyloid process which articulates with the transverse process of the first cervical vertebra. Direct injury to the facial nerve can be avoided; a temporary paralysis may result from traction of the soft parts. In only one out of twelve cases was a temporary paralysis observed.

As to the therapeutic value of this operation nothing more can be said at present, in view of the difficulty of answering this question and the small number of published cases, than that further absorption of infectious material from this focus was arrested. From these brief excerpts it will be seen that Grunert's excellent monograph is most instructive and stimulating.

A. K.

Obituary.

Professor A. A. G. Guye.

News of the death of this well-known Netherlands aurist, which took place on January 15, 1905, will be received with great regret by his colleagues. He belonged to the old otological guard, and aided in the development of modern rhinology and otology for a period of forty years.

Guye was born on August 17, 1839, in Maastricht. He studied medicine in Amsterdam, and graduated in Leyden in 1862. He then studied under Troeltsch and Politzer, then in Berlin and Paris, and on his return to Amsterdam gradually devoted himself exclusively to his specialty. In 1886, he was appointed Extraordinary Professor of Otology, the first occupant of the chair. His inaugural address was on the importance of Otology in medical science.

In a short time his fame as an aurist became very great, and for many years he was the first otologist in his country. He was appointed for nine successive years President of the Netherlands Society for Diseases of the Ear, Nose, and Throat, which he and Zwaardemaker founded in 1893.

His publications began in the year 1865, and have appeared in four different languages, and on almost every division of Rhinology and Otology. Though he did not devote very much of his time to laboratory work or experimental investigations, his time was chiefly occupied in his consulting-rooms, especially in his policlinic, in which he was generally occupied from three to five hours daily without interruption.

He possessed unusual scientific intuition, and was early impressed with the importance of normal nasal respiration. He constructed the first contra-respirator. He was one of the first to attack adenoid vegetations, and described a ring knife, which was introduced through the mouth. In this combat he was tireless. The governmental investigation of the frequency of adenoid vegetations in school children was started at his instigation.

The best-known papers of Guye are those on Nasal Apraxia. Though others had recognized before him the disturb-

ances of mental functions consecutive to nasal disease, he was surely the first to recognize the importance of these disturbances and to have offered a satisfactory hypothesis. The pathology of the static organ was always of great interest to him. He was one of the first to connect the form of subjective sensation of rotation in Ménière's disease with the planes of the semicircular canals. He also succeeded in showing that in most cases aural vertigo depended upon disease of the middle ear and not on a primary labyrinth affection.

Though the name of Guye will remain prominent in the annals of Rhinology and Otology, the death of this many-sided man will be felt as a personal loss by many. He was a true international figure, and was able to speak and write German, French, and English with equal facility with his mother tongue. He assisted in the foundation of the German Otological Society, as well as the French and the Paris Oto-Laryngological Assemblies.

He also devoted a great deal of time to improving the condition of physicians in his country. He served as Secretary of the General Netherlands Society of Physicians for fifteen years, and during five years edited the largest Netherlands medical weekly. In 1879, he was General Secretary of the Sixth International Medical Congress, and in 1888 he was presiding officer of the meeting of the Netherlands Scientists and Physicians.

H. BURGER.

Professor Louis Jacobson.

Professor Jacobson died in Berlin on January 26th of this year. He was born in 1852, in Königsberg, the son of a Professor of Medical Physics. He studied in Königsberg and in Berlin, and received his training in Otology under Politzer, in Vienna. In 1877, he became an assistant in the Berlin Ear Clinic, under Professor Lucae, and in 1897 he received the title of Professor. His most important work is his text-book on Otology. He was well versed in physics, and was most interested in the study of acoustics and in experiments which were characterized by unusual care and judgment. His memory will be preserved by the importance of his scientific papers. He was the second presiding officer of the Berlin Otological Society. Many patients and friends will remember him as an excellent man and a charming physician.

BRUEHL.

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ARCHIVES OF OTOTOLOGY.

A CASE OF MASTOIDITIS IN AN INFANT OF ONE AND A HALF YEARS, WITH A SEQUESTRUM CONSISTING OF A LARGE SEGMENT OF THE PETROUS PORTION OF THE RIGHT TEMPORAL BONE. REMOVAL OF THE SEQUESTRUM AND STAPES. RECOVERY.

By WILLIAM C. BRAISLIN, M.D.,

SURGEON, BROOKLYN EYE AND EAR HOSPITAL.

This child, the infant son of a Brooklyn postman, was referred to my clinic at the Eye and Ear Hospital by the physician who had already determined the presence of dead bone in the auditory canal.

This baby was emaciated and anæmic to an extreme degree; the lymphatics of the neck were enormously swollen and the general appearance of the child was that of a marasmic infant. It had a loose, rattling cough. Both ears were discharging thick, yellow pus, the right ear more profusely. In the right ear, dead bone could be detected with the probe along the upper part of the canal and inward to the middle ear. The child was placed in the children's ward with directions to syringe the ear thoroughly every two hours and to improve the nutrition by tonics and medication. It was listless and apathetic, and even when the ear was examined pressure about the ear did not cause it to cry. The discharge from the right ear was so abundant that, even with the short intervals between the time of cleansing, it collected in the concha and ran down the neck.

On the fifth day in the hospital the child was brought to the operating-room, and as a preliminary to performing a radical mastoid operation the ear was again thoroughly explored. This after the rigorous cleansing during the previous few days was comparatively easy. The necrosed bone was in the form of loose sequestra, slightly movable under the probe; the middle-

ear cavity was nearly filled with exuberant granulations. The child did not complain during the exploratory manipulation of the ear, and seemed to feel no discomfort when the sequestrum was grasped by the forceps and traction exerted. The sequestrum was quite freely movable, and its size was not appreciable owing to its upper portion being hidden by the overlapping soft parts of the orifice of the superior meatus. As the child seemed to suffer but little from the operation, and also because the complicating bronchitis rendered it desirable to avoid an anæsthetic if possible, the removal of the sequestrum was undertaken without one.

The large sequestal mass was therefore extracted through the meatus. A Hartmann's forceps was used to grasp the loose bony fragment, and its extraction was accomplished without difficulty. The meatus was torn slightly at its upper periphery. Several other small fragments of necrosed bone were also removed. Dark necrotic granulations were found to cover the outer surface of the dura and walls of the large cavity thus exposed. Necrotic material and shreds of foul pus were now syringed away with irrigation of bichloride of mercury solution. The dura mater was exposed over a considerable area, but search with a probe failed to discover any perforation through it, and it was regarded as intact.

No dressing was applied, but repeated irrigations of 1:10,000 bichloride solution were ordered with the patient recumbent to prevent the solution from running through the Eustachian tube in any considerable quantity.

A week later, while probing the mass of granulations lining the middle-ear cavity, a small bare spot of bone was encountered. This was the crus of the stapes, and on grasping it the stapes was readily removed from its bed in the foramen ovale.

Subsequent treatment consisted in syringing with boric-acid solution, occasionally touching the granulations lightly with nitrate-of-silver solutions ($\frac{1}{4}$ to $\frac{1}{2}$ saturation), the administration of cod-liver oil emulsion and other tonics.

The left ear, which had no necrotic process, was treated, with the exception of the operative measures, much like the right, but was about a week later in completing the healing process.

In the right ear, the drum membrane was re-formed in about twelve weeks; the left, in about thirteen weeks. After the removal of necrosed bone from the ear, the subsidence of the

lymphatic swelling was as surprisingly rapid as was the increase in weight and nutrition of the patient.

The large sequestrum is a pyramidal piece of bone, three-sided, its base representing the outer cortex of the mastoid; its apex (detached) containing about one-quarter (the upper and posterior segment) of the annulus tympanicus. It represents the entire bony framework between the auditory canal and tympanic cavity below and the dura above. The smaller fragments represent portions of the mastoid.

TWO ANATOMICAL ANOMALIES ENCOUNTERED IN LIVING SUBJECTS DURING THE PER- FORMANCE OF MASTOID OPERATIONS.

By WILLIAM C. BRAISLIN, M.D.,

SURGEON, BROOKLYN EYE AND EAR HOSPITAL.

I.—Hiatus of large size in the cortex of the mastoid, opening directly into the mastoid cells.

Patient is a Danish girl, twenty-eight years of age, who came to the Brooklyn Eye and Ear Hospital for the relief of earache and mastoid tenderness. She had suffered from a previous attack somewhat similar to this, four years before, the exact character of which she could not clearly describe. She was in a general hospital on that occasion; no operation was performed on the mastoid itself, but a great mass of (probably) enlarged cervical glands on the same side of the neck persisted, and this condition was relieved by operation at that time. Since, she has had several attacks of earache, accompanied by pain behind the ear and tenderness to the touch.

The pain of the present attack has lasted about three weeks. For some days it has been nearly continuous, and at times very severe. Some discharge occurred early, but has now nearly ceased. Tympanic membrane partly cicatricial; a small attic perforation present. The mastoid prominent, somewhat œdematous, and very sensitive to even light pressure. Temperature, after entering hospital, showed a typical, irregular, septic course. A prominent scar extended from a point an inch below the tip of the mastoid, along the border of the sterno-mastoid muscle almost to the clavicle. No scar existed over mastoid bone.

The patient was placed in the wards, and, the symptoms per-

sisting and the temperature chart revealing the above-mentioned irregularity, operation was performed three days later. Previous to the incision, the probability of its being a Bezold's mastoiditis was expressed. The peculiarity of the case was noted on exposing the periosteum. What appeared at first a large, dark, necrosed area proved on incising the periosteum to be a natural fissure leading into large cells, containing but little fluid. The fissure was three-quarters of an inch long by a quarter broad at its greatest diameter. It lay in the line of the masto-squamosal suture, the hiatus in its long axis running parallel with the posterior border of the external meatus, from which it lay about half an inch, extending downward half way to the mastoid tip. The cells were ablated, antrum entered, and wound packed.

This peculiarly large hiatus seemed to have been responsible for the two unusual particulars in which this case differed from an ordinary attack of mastoiditis.

1. The first attack, four years ago, apparently manifested itself chiefly in an involvement of the cervical lymphatics of the same side of the neck. Marked inflammation of these glands was no doubt due to the fact that extension of pus through the open bone was readily allowed, giving rise to early involvement of the cervical lymphatics, so extensive as to require their thorough removal.

2. The present attack presented the rather unusual history of *gradually increasing* pain and a septic temperature more pronounced in degree than the severity of the mastoid disease, as disclosed at the operation, would naturally occasion. An incompetent resistance to septic absorption due to the absence of the (previously removed) cervical lymphatics probably accounted for this phenomenon.

Defective closure of the masto-squamous suture often results in early sub-periosteal abscess of the mastoid (Macewen).

Macewen figures two cases (*Pyogenic Infective Diseases of the Brain and Spinal Cord*, Glasgow, 1893, oppo. pp. 10 and 12), neither, however, approaching the extent of the hiatus in the case just described. Cases of open masto-squamosal suture are more common in early life, but the possibility of their occurrence in adults may be borne in mind.

II.—Unusual depth of the supra-mental depression in the triangle of Macewen.

The depression, usually found just above the upper posterior portion of the bony wall of the meatus in the triangle of Macewen, is ordinarily insignificant, often lacking; sometimes its normal site is occupied by a slight projection.

In operating for acute mastoiditis in a tall, spare young man of twenty-one years, a depression fully $\frac{1}{4}$ of an inch deep was disclosed in this space. It stopped short of the mastoid antrum. Its depth was bounded by firm bone.

SOME MOOTED POINTS IN THE TREATMENT OF PROTRACTED CASES OF ACUTE MIDDLE- EAR DISEASES AND THEIR COMPLICATIONS.¹

By ALFRED WIENER, M.D.

THE result of an experience in the treatment of a class of cases, a report of which was made before the Metropolitan Society of this city a short time ago, with the apparent lack of risk which this treatment assured, has persuaded me to present this subject for discussion before this Society. There still appears to exist a great difference of opinion amongst otologists when the proper time has arrived for radical interference, in a class of cases which I shall refer to in this paper.

The report above referred to was based upon an observation of twenty-two cases. They were classified under the title of protracted forms of acute purulent middle-ear disease with complications. In order not to weary you with the histories in detail, the typical picture represented by these cases, in brief, was the following :

The presence of a continued discharge in an ear for two or three weeks, after various forms of infection including influenza, scarlet fever, diphtheria, measles etc., the sudden appearance of an acute exacerbation attended either by a gradual or rapid rise of temperature, with pain on pressure over the apical and antral regions, reddening and bulging of the posterior and superior portions of the tympanic membrane and canal, with more or less obliteration of the distinctive landmarks of the drum membrane. A small

¹ Read before the Otological Section at the Academy of Medicine, February 9, 1905.

perforation existed in some of the cases and in others none could be found. In the majority of these cases after the secretion was wiped away, varying remnants could still be drawn into the canal with Siegel's speculum. It was felt that in these cases, in addition to the middle ear, the antrum had also been invaded and had complicated the picture. In regard to the mastoid, a doubtful opinion was expressed, viz., as to whether there was simply a congestion or the beginning formation of an abscess. This was left for the treatment to decide.

The treatment which was employed in these cases had for its object thorough drainage through the external auditory meatus, combined with antiphlogistic measures. First, a liberal incision was made extending through the posterior superior portion of the external auditory meatus, and posterior superior and inferior quadrants of the drum. This was followed by a thorough politization and aspiration with Siegel's speculum. The secretion was carefully wiped away, and a drain of half-inch strip iodoform gauze, dipped into a ten per cent. solution of liquor aluminii acetatis, was placed in the canal to facilitate drainage, and at the same time to exert its antiphlogistic influence upon the œdema present. This was covered with an occlusive dressing wet with the same solution and a bandage applied. It was changed once or twice a day as was found necessary. In addition to this, strict attention was paid to the constitutional treatment, in giving the proper amount of nourishment and tonics if necessary. In all the cases treated, constant observation was insisted upon and the local treatment to be carried out by a competent attendant. This was considered a very important part of the treatment, for in this way only could the presence of any unfavorable symptoms be at once recognized and the proper treatment carried out. If after such treatment there was a persistence of the initial symptoms, or the sudden appearance of those symptoms which we at once recognize as serious, operative interference was at once advised. Up to the present time, with a record of forty-two cases of this type, four cases demanded operative treatment. In all these cases the patient

was given the chance of conservative measures. Of the four cases which were operated upon three recovered, and one died, undoubtedly from the consequences of the primary infection, diphtheria. It was while following out this plan of treatment that two questions constantly and vividly presented themselves to me for consideration. I hope that these questions will bring forth the discussion which they deserve.

The questions above referred to are the following:

(1) Under what condition can we pursue conservative measures without endangering the life of the patient?

(2) Does early operative interference prevent the occurrence of serious complications in this class of cases?

In regard to the first question, I believe that conservatism practised under the strict precautions mentioned, viz., "constant and competent observation," is practically devoid of danger. As soon as we have convinced ourselves that the persistence of the symptoms present precludes the success of this treatment, or we notice the occurrence of unfavorable symptoms, then there should no longer be any hesitation in radical interference. The presence, in an acute exacerbation of a protracted case, of such symptoms as a temperature of 104 degrees, with tenderness to pressure over the antrum and mastoid regions of the temporal bone, with bulging of the posterior superior quadrant of the tympanic membrane and œdema of the neighboring portion of the external auditory meatus, a small perforation, and discharge within the canal, should not at once persuade us to open the mastoid. How frequently such symptoms will disappear after thorough drainage and antiphlogistic measures have been employed, as above mentioned, I am sure most of us will acknowledge. It is incumbent upon us to give the patient this fair trial, and it then remains for us to observe whether such improvement will continue.

Of the forty-two cases observed under this plan of treatment, eleven were beyond the age of four years. I purposely refer to the age of these patients, because the structure of the temporal bone in children below the age of four differs very much from that of the adult. "In the

newly born, the antrum is the only pneumatic space present in the mastoid bones situated behind the tympanum, and—what I wish to lay especial emphasis upon—at a higher level. A cellular mastoid at this time does not exist. These cells in the mastoid do not develop until the period between the second and third years. According to Schwartze and Eysell, these cells, when they do develop, are arranged in a typical manner radiating toward the antrum. This arrangement in the adult is seldom recognizable, partly through the formation of new osseous septa, and partly through the disappearance of those already formed"—(Poltitzer). It will at once be seen that the anatomical structure in children is a very advantageous one, assisting very materially in our efforts at drainage. The four cases which did not respond to treatment were beyond the age of twelve years. It does seem, taking all things into consideration, that the child under four years of age will bear conservative measures much better than the older child. A much larger experience is necessary, however, to determine this point.

The brief history of the following case is that of one of the four cases out of the forty-two, above mentioned, which eventually underwent an operation, after conservative measures had been given a fair trial. As it illustrates in a manner to what extent conservative measures may be employed, it may be of interest to relate it.

A young girl, sixteen years of age, had just recovered from an attack of tonsillitis. She began to complain of pain in her right ear, and I was asked to see the case. During the first twenty-four hours there was the distinctive evidence of an acute otitis media. On the second day, this was attended by so much pain together with redness and bulging of the drum that a paracentesis was performed. A gauze drain with an occlusive wet dressing and bandage was applied. The next day the patient felt very much better. The discharge was free and the bulging considerably less. The temperature was 99°. For ten days this patient did very well; the treatment during all this time consisted in simple cleansing measures. Suddenly, on the twelfth day, there was a sudden rise of temperature to 102° with a return of

pain in the ear. There was pain on pressure over the antrum and tip of the mastoid process. The drum was bulging over the posterior superior quadrant, and the adjacent portion of the external canal was oedematous. There was a slight discharge within the canal. With a Siegel's speculum more was obtained from behind the tympanic membrane. The impression gained was that, in addition to the purulent middle-ear disease, there was, due either to insufficient drainage or to a further invasion of the disease, an involvement of the antrum and mastoid process. Although an opinion had been expressed that interference was a wise procedure, but not urgent, I was inclined to give the patient another chance. The argument was offered that as these parts were probably only in a state of congestion, and as it was too early for an abscess to have as yet formed, I would prefer to pursue the plan which has been so successful in similar cases. A second paracentesis was to be made, followed by aspiration, gauze drain, wet dressing, etc. This was accepted and carried out. The patient improved to such an extent that after four days a consultation was held and it was decided that no interference was necessary. The treatment of thorough cleansing with aspiration gauze drainage and wet dressing, occasional syringing with 2 % lysol, was carried out, until the patient was up and about. Her appetite was good, her rest at night undisturbed, and she suffered no pain whatsoever, either spontaneous or on pressure. For three weeks this patient did very well. The discharge was scarcely preceptible. Suddenly one morning there was noticed a slight bulging of the posterior superior portion of the canal and drum membrane. On aspiration there was a slight discharge, tinged with blood. That evening the temperature rose to 101°. The mastoid again became tender on pressure. The next morning there were nausea, slight vertigo, spontaneous pain, and fulness in the mastoid process. Operation was at once advised and performed on the afternoon of that day. I found the mastoid cells at the tip and middle portion filled with a purulent secretion. As I approached the antrum, a broken-down mass of cells, granulations, and pus was encountered. The sinus was laid bare but found perfectly healthy. The dura was exposed over the middle fossa with negative findings. The greater part of the trouble appeared to exist in the neighborhood of the antrum. The usual dressings were applied, removed after the sixth day, changed after the eighth

day, when it was found that the middle ear had ceased to discharge. The wound after five weeks is almost healed.

Considering for a moment the plan of treatment in this case, I believe the point of discussion will rest upon whether interference should have been insisted upon at the time of the second paracentesis. The arguments which I have to offer against such interference are, that at the time no positive diagnosis could be made in regard to the actual pathological condition in the mastoid, that there were no urgent symptoms warranting any interference, that experience has taught us that we often meet with pain on pressure over the antrum and mastoid regions which disappears in these cases after twenty-four to forty-eight hours, and is simply to be explained on the hypothesis of congestion. Furthermore, it has been my experience that relief can often be brought about through the means of thorough drainage as hinted at above. I thought it no more than justice to this patient to give this method a fair trial. Furthermore, another argument against early interference in a case of this kind, as has been proven in similar cases, when the abscess has not as yet formed, is the fact that it makes it very difficult for us to decide during the operation just what and what not to take away. Politzer states that the experience of the last few years has taught him, that in many cases the too early opening of the mastoid process—that is, already on the fourth and fifth day—has an unfavorable effect upon the course of the disease and on the process of healing. "One finds," says he, "especially in those mastoids composed of small cells, which are opened during the first eight days of the disease, several disseminated collections of pus spreading in all directions, from the size of a pin-head to that of a hemp seed, instead of an abscess cavity. In such cases the wound heals badly, in fact much worse than if one cavity were found, as it is seldom possible to remove all the diseased bone substance." The wisdom of the above statement one learns through experience. After the second paracentesis, the patient did so well that it was agreed in consultation with one of my colleagues by no means to interfere, and to continue with conservative

measures. The case was kept under strict surveillance, allowed to be up and about, until one day there was a sudden appearance of suspicious symptoms pointing to an involvement of the mastoid process. At once operative interference was insisted upon and the mastoid was opened. I was able to clean out that mastoid with the greatest ease and establish a good communication with the antrum. The rapid improvement of the patient, the absence of all discharge from the middle ear after the second dressing, which took place on the eighth day after operation, all the serious symptoms disappearing after forty-eight hours, and the patient at the present moment, five weeks after the operation, almost well, simply strengthen the opinion, as has also been proven in other cases, that under strict observation such conservatism may be practised without risk to the patient.

In attempting to answer the second question, "Does early interference prevent serious complications?" an explanation must be forthcoming from those cases which, when operated upon at the earliest possible moment, are nevertheless attended by most serious complications. There are cases, it will be admitted, in which the onset of the disease is stormy and the symptoms are persistent in spite of all treatment. It does appear that either the infection is so virulent, or the resistance on the part of the patient so poor, that, in spite of every measure that is employed to combat the further progress of the disease, we fail. I mention these cases because, should conservatism be practised in cases of this kind, which I surely would not advise, one must not forget the fact that after all these cases are desperate ones from the very beginning. Twenty-four hours' observance by a competent man will decide this matter at once. The point which I wish to make in these cases is the following: Given a patient two years of age, we will say, with a protracted form of otitis media, who suddenly develops a temperature of 104° , with pain on pressure over the antrum and mastoid process, with bulging of the superior posterior portion of the canal and tympanic membrane, a small perforation, with discharge in the canal,

bacteriological examination showing streptococcus infection, coming on after scarlet fever, should in a case of this kind interference be practised at once to avoid serious complications? Personally I am satisfied to pursue conservative measures until I am convinced that they are utterly useless. Such a procedure must of course be guided and controlled by the most careful observation of the patient. The presence of an urgent symptom or the persistence of the above symptoms for thirty-six hours would cause me to change my plan at once and proceed to operation. These cases are not attended, when conservatism is practised in this way, by any more serious complications than if interference were practised at once. The laity has a right to demand of us a most careful consideration of each individual case. If there exists a method of treatment which is without risk to the patient and which may spare him the ordeal of an operation, he should be given the benefit of this method.

A REPORT OF TWO CASES OF ACUTE OTITIS
MEDIA SUPPURATIVA, FOLLOWED BY MAS-
TOIDITIS AND MENINGITIS, AND CAUSED BY
THE DIPLOCOCCUS INTRACELLULARIS OF
WEICHSELBAUM.¹

By GORHAM BACON, M.D.

(*With a temperature chart.*)

CASE 1.—The patient, Jeremiah R., a law student in New York, twenty-five years of age, came under my care on December 19, 1898. He gave the following history:

He has had typhoid fever and measles. Six years ago he first had trouble with his right ear as a result of diving, when he ruptured the drumhead. This was followed by a discharge for a few days. This soon ceased and the ear has been all right since then. Twelve days ago he had a severe attack of influenza, and since then he has been in bed most of the time. Two days ago the left ear became painful. The pain, very severe in character, commenced in the morning, and in the afternoon the drum-head ruptured. The discharge, at first bloody, then serous, has since been very profuse and continuous. The pain has not been relieved by the appearance of the discharge.

Examination.—Profuse discharge from the **left** auditory meatus, thin and watery in character. Very marked mastoid tenderness on the same side. The patient was put to bed and the Leiter coil was applied, while the ear was ordered douched with a warm bi-chloride solution every two hours. Calomel was administered in small doses.

¹ Read before the Section on Otology of the New York Academy of Medicine, February, 1905.

Dec. 20th.—Mastoid tenderness more marked than at time of admission. Posterior superior wall of the left external meatus drooping. Discharge from the canal still very profuse, and a microscopical examination shows great abundance of pneumococci and micro-organisms, which resemble very closely the gonococci, but which were in all probability the micro-organisms found in some cases of meningitis, called by some the meningococcus, or the diplococcus intracellularis meningitidis of Weichselbaum.

Under ether, the usual mastoid incision was made, extending from the tip to a point well above the posterior root of the zygoma and down through the soft tissues and periosteum to the bone. The hemorrhage was controlled and the flaps were retracted. The attachment of the sterno-mastoid muscle was thoroughly detached from the mastoid process and the cortex was found dark in appearance. The mastoid cells were filled with granulation tissue and softened bone, and there was creamy pus in the tip. The mastoid process was of the pneumatic variety. All the granulation tissue, pus, and softened bone were thoroughly removed with curettes. The entire outer wall of the mastoid cells was thoroughly cut away with chisels, gouges, and rongeur forceps and a free communication established between the antrum and the middle ear. The wound was irrigated with bichloride solution and packed with iodoform gauze and then bandaged.

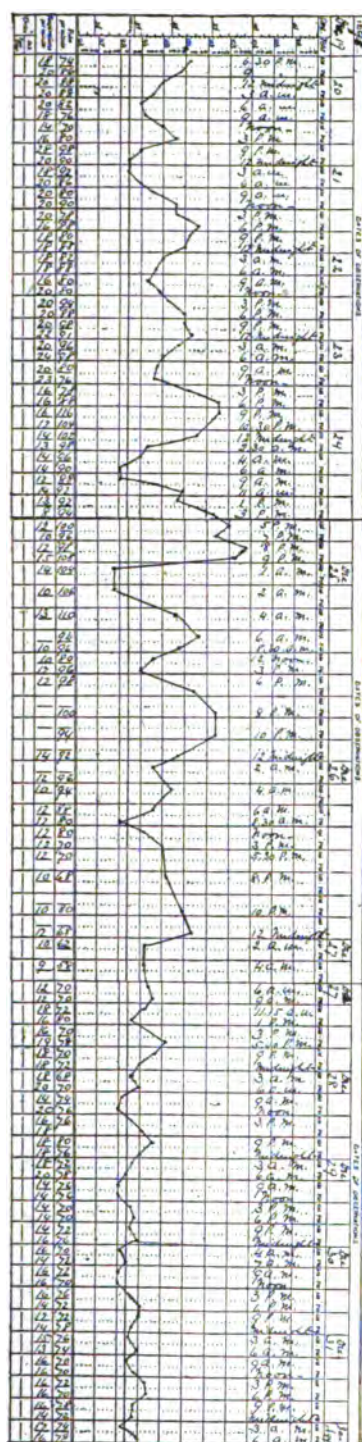
Dec. 21st, 6 A.M.—Patient had a slight chill, and slept about two hours during the night. He coughed a great deal and complained of considerable pain during the night. During the afternoon he was very restless.

Dec. 22d.—The patient did not rest well during the night but complained of pain in the right ear, and this morning there was a profuse discharge of a straw-colored fluid from the canal. On examination there was seen a small perforation in the **right** drumhead, which was enlarged to afford better drainage.

Dec. 23d.—The wound behind the left ear was to-day dressed. The patient is fairly comfortable. The Leiter coil was applied over the right mastoid, owing to pain detected in this region.

The temperature as shown by the chart has varied considerably. At 9 A.M. it was $99.\frac{1}{4}^{\circ}$; at 6 P.M. and 9 P.M. it was $102.\frac{1}{4}^{\circ}$. The pulse was inclined to be slow, as well as the respirations.

10 P.M.: Patient very restless and unable to sleep—sighing



respirations, and only 12 to the minute and irregular at times. He does not complain of any particular pain. Nausea seems to be his chief complaint, and at 10.30 P.M. he vomited after drinking some milk.

Dec. 24th.—Patient did not vomit again after 10.30 P.M., and he has had no chill. He rested very well after that time. He complains considerably of pain in the chest when he coughs, although nothing abnormal can be discovered by a physical examination. At 6 A.M. temperature normal, pulse 90, respirations 14.

3 P.M.: The temperature has gradually risen until now, when it is $102\frac{1}{4}^{\circ}$, pulse 94, respirations 8.

6 P.M.—The patient complains of feeling very tired. He has retained all his nourishment. The respirations are irregular, labored, and 10 in frequency. He has been given whiskey and strychnia. Pulse weak and intermittent.

Dec. 25th.—During the past night the temperature rose to $103\frac{1}{4}^{\circ}$, but fell this morning at 1 A.M. to $97\frac{1}{4}^{\circ}$ F.; pulse 104, respirations 14. At 2 A.M., the temperature was the same, but the respirations were 10. During the day the temperature gradually rose to $101\frac{1}{4}^{\circ}$ at 6 A.M., only to fall again to 99° at 3 P.M. It gradually rose again till it reached $102\frac{1}{4}^{\circ}$ at 8 P.M. Discharge from right ear slight.

11 P.M.—On account of the variations in the temperature, the slow respirations, and other symptoms of brain pressure, the patient was again taken to the operating-room and etherized. The symptoms pointing somewhat to involvement of the sigmoid sinus, it was deemed advisable to expose that sinus thoroughly after removing the dressings. The wound from the former operation presented a normal appearance. The outer bony wall covering the sinus was carefully removed, and the sinus presented a normal appearance and on palpation seemed to contain fluid blood. The sinus wall was accidentally punctured, and a copious flow of blood followed, establishing the fact of the non-existence of a thrombus. The sinus was then packed and the hemorrhage controlled, and an incision was then carried backward through the soft parts down to the bone. With chisels an opening was then made in the cerebellar fossa and an aspirating needle introduced in different directions, but with a negative result. As the middle cranial fossa had also been exposed and no pus found there, no further operative interference was undertaken. The wound was irrigated with bichloride solu-

tion and packed in the usual manner, and the patient was again put to bed.

Dec. 26th, 8.30 A.M.—Temperature 98° , pulse 80, respirations 12. He slept some, but complained of pain in his head.

8 P.M.—Temperature $100\frac{1}{4}^{\circ}$, pulse 69, respirations 10. At midnight the temperature had gradually risen to $101\frac{1}{4}^{\circ}$.

Dec. 27th, 4 A.M.—Temperature $99\frac{1}{4}^{\circ}$, pulse 58, respirations 9.

5.40 P.M.—Temperature rose to $100\frac{1}{4}^{\circ}$, pulse 78, respirations 19.

Dec. 30th.—The patient has been given considerable milk frequently, also whiskey and strychnia. The temperature is practically normal; pulse varies from 70–78, respirations from 12–20. He sleeps well.

Jan. 4th.—The patient has gradually improved in every way, and the temperature, pulse, and respirations are normal.

Jan. 11th.—He has been out for a short walk for the first time to-day.

Feb. 7th.—The discharge from each ear has ceased, and the drumheads have healed.

CASE 2.—Mary M., aged thirty-two, married, English, was admitted to the hospital, Nov. 22, 1904.

Previous History.—Ten years ago she had an earache on the left side, which lasted for about three weeks. The present attack began five weeks ago with severe pain in the same ear, followed in two days by a discharge, which continued steadily for two weeks. The pain then began to diminish, and ceased altogether up to three days ago, when the discharge again appeared, but only to a slight extent.

Present Condition.—Tenderness well marked over the mastoid antrum and tip on the left side. Canal filled with pus, and drumhead could not be seen on account of granulations blocking the lumen of the canal.

On Nov. 24th, a Schwartz-Stacke operation was performed. The usual incision was made behind the auricle and down to the bone. After removing the entire outer cortex from the antrum to the tip, the cells beneath were found necrosed, and especially so at the tip, which later was full of pus.

The tip was removed and the cells up to the antrum as well as some in the zygoma. The dura above was exposed and found covered with granulations. The posterior canal wall was removed, as well as the external wall of the attic, and the antrum and middle ear were turned into one cavity.

The meatus was enlarged by the Ballance flap. The cavity was irrigated and partially closed behind, and the external auditory canal packed with strips of iodoform gauze. An examination of the pus from the external meatus was made by Dr. George Sloan Dixon, and it was found to contain the diplococcus intracellularis meningitidis of Weichselbaum, as well as the pneumococcus.

Nov. 26th.—The patient's temperature has varied from 101° F. on Nov. 22d, when admitted, to $103\frac{1}{8}^{\circ}$ F. to-day. Nov. 27th it came down again to 101° in the early morning, only to rise again to $105\frac{1}{8}^{\circ}$ on the same day. The patient for several days had complained of severe frontal headache. The patient was again etherized and the sigmoid sinus was thoroughly exposed. A few granulations were found on its wall. The tension seemed normal. A free incision was made in the sinus. There was a copious flow of blood from the upper end, but it was sluggish from the lower one, so that a curette was introduced down to the bulb, when a free flow of blood followed. The bone was then removed over the antrum, and a large area of dura exposed in the temporo-sphenoidal region. The dura was somewhat dark and covered with granulations. An incision was then made in the dura, and a director was introduced in different directions in the temporo-sphenoidal lobe, but no pus was found.

Nov. 29th.—Patient dull and apathetic. After the operation the temperature fell to 102° , and on Nov. 28th was as low as $100\frac{1}{8}^{\circ}$ F., but gradually rose to $105\frac{1}{8}^{\circ}$ F. on Nov. 29th. The fundus of each eye was examined, but nothing abnormal was found. The pain in the head (frontal and parietal regions) very severe, and the patient had a well-marked meningitis. An examination of the chest showed moist râles over the entire posterior surface of the left lung, with some scattered crepitant râles over the anterior surface of the same side. No areas of dulness, no bronchial breathing.

The patient gradually failed, the symptoms of meningitis being more marked. She lingered several days, became comatose, and died.

I have reported these cases to this Section to-night as they seemed to me to present several points of interest. They prove to me conclusively the great value in every instance of making a bacteriological examination of the pus

found in the middle ear. In the case of the law student, he started in with what seemed to be a severe attack of gripe. The middle ear on each side became affected, and the disease spread rapidly to the mastoid cells. At the time of the bacteriological examination, the pathologist at the Infirmary, Dr. George Sloan Dixon, was not familiar with the appearance of the diplococcus intracellularis meningitidis of Weichselbaum, as examinations of the pus from the ear of aural patients had not up to that date revealed the presence of such an organism. He reported at that time, however, that the organism present in this case resembled very closely the gonococcus, but very probably was the diplococcus intracellularis. Abbott, in the *Principles of Bacteriology*, says: "Diplococcus intracellularis meningitidis of Weichselbaum, isolated from the pus of cerebro-spinal meningitis, is microscopically also strikingly like the gonococcus as it is seen in pus." A brief glance at the temperature chart, especially from the dates, Dec. 23d to Dec. 26th, would suggest the possibility of a septic thrombus. It will be noticed, however, that even when the temperature reached 103.8° F., the pulse was only 98 and the respirations 12. Again, on Dec. 24th, when the temperature was 102.4°, the pulse was 94 and the respirations only 8.

The only explanation I can offer as to the cause of improvement in the patient's condition after the operation was that the intracranial pressure was in a measure relieved by the copious bleeding.

As to the second case, the patient had meningitis in all probability when admitted to the hospital, for she had had a severe pain in her head for some time previously, and when the dura was exposed in the temporo-sphenoidal region it was found very much thickened, involving quite an extensive area and was covered with granulations. There was no question about the presence of the diplococcus intracellularis of Weichselbaum in this case.

REPORT OF A CASE OF INFECTIVE SIGMOID SINUS
AND JUGULAR THROMBOSIS COMPLICATED BY
LEPTOMENINGITIS. LUMBAR PUNCTURE; SUB-
DURAL IRRIGATION; DEATH.¹

By JOHN D. RICHARDS, M.D.,

ASSISTANT SURGEON, NEW YORK EYE AND EAR INFIRMARY.

(With a temperature chart.)

Male, aged six years, from the clinic of Dr. Robert Lewis, Jr., New York Eye and Ear Infirmary, with a history of chronic suppurative middle-ear disease arising from one of the infectious fevers. The present illness is due to an acute process grafted upon the chronic condition. There is a subperiosteal abscess, a small cortical perforation, and the interior of bone, upon opening it, was found filled with a collection of fluid, pulsating pus; the bone involvement was moderately extensive; a Stacke-Schwartz operation was performed. The visceral plate of the mastoid was everywhere intact, except for a pinhole perforation in the sinus groove immediately over the sinus knee, through which there issued, with each pulsation of the brain, a jet of thin fluid pus. The sinus groove was removed from a point slightly beyond the knee to a point near the bulb, and a moderate-sized perisinuous epidural abscess evacuated. This collection of pus was hemmed in by a limiting pachymeningitis, and rested upon a bed of granulations which invested the sinus knee, the upper portion of the vertical limb of the sinus, and the adjacent dura, in all an area the size of a silver quarter. This granulation layer was not thick, did not materially interfere with the accuracy of palpation, and after close examination of the vessel I took it to be normal and uninvolved except for the granulations in-

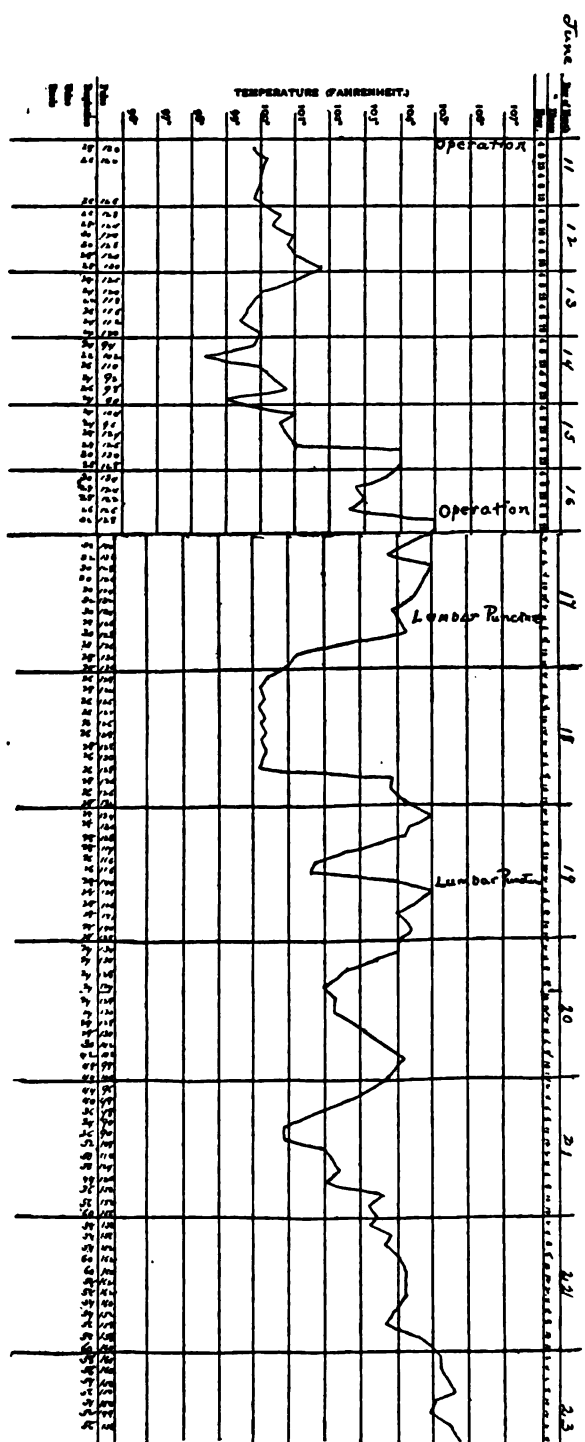
¹ Reported at the New York Academy of Medicine, February 9, 1905.

vesting its parietal wall ; the vein dimpled evenly in all directions, was resilient and pulsating. The temperature of the patient at the time of operation was $99\frac{1}{4}^{\circ}$; there were no symptoms indicative of thrombosis—nothing in the history pointing to intracranial involvement. Child was returned to bed in good condition. For four days the patient did well, when suddenly the temperature jumped to 104° F., fell gradually during the night, and on the following morning reached $102\frac{3}{4}^{\circ}$, when it suddenly jumped to 105° F. Stiffness of neck and marked irritability were now noticed ; the symptoms pointed to meningeal invasion.

The sigmoid sinus was opened in the granulating area ; its lumen blocked by a completely obstructing thrombus, the consistency of which made it certain that this clot had existed for some time prior to the original operation and had simply eluded detection. The external wall of the upper end of the vessel was now slit out on the lateral sinus, the upper limit of the thrombotic involvement passed, a free return of blood secured, and this end compressed.

The external wall of the lower end of the sinus was now slit down to a point as near the bulb as the bone removal would permit ; no flow occurred. Upon turning the divided vessel wall aside, a soft liver-colored coagulum of blood representing a recent thrombus, was seen to extend from the cardiac side of the firmer clot down into the jugular bulb. This clot lay loose in the sinus and was not firmly attached to the interior of the vessel. No attempt was made to curette the region of the bulb, nor to extract this clot with forceps. A jugular resection was immediately performed. The upper portion of the vein contained a recent thrombus similar to that occupying the lower portion of the vertical limb of the sinus. The neck wound was now packed. With a pair of forceps a clot about one inch in length was extracted from the region of the bulb ; as this was done a return flow occurred from below, evidently coming from the condylars, the inferior petrosal sinus, or from both.

The patient returned to bed in good condition. The temperature was not affected by the operation ; the irritability continued. The following day a lumbar puncture was made, a turbid fluid withdrawn. Immediate microscopic examination showed streptococci in abundance, pus cells, and a diplococcus. Following lumbar puncture the temperature fell quickly four degrees,



remained at $100\frac{3}{4}^{\circ}$ for fourteen hours, when it again jumped to 105° F.

A second lumbar puncture was made, showing streptococci in long chains, pus, blood, a diplococcus. From the symptoms it was evident that the meningeal invasion was increasing and an attempt was made to irrigate the subdural space; this proved futile, and in a few days the child died, having presented the symptom-complex of a general cerebro-spinal leptomeningitis.

The points in the case which appear to be of interest from a practical standpoint are the following:

1. The question arises as to what constitutes a legitimate suspicion that a sinus is thrombosed. Certainly we can not accept the mere presence of granulations upon the sinus wall as such; yet in this particular instance, with the exception of the granulations investing the dura, there were no symptoms indicative of intracranial involvement.

2. The case well illustrates what is true of a large portion of these cases, *i. e.*, in many instances we do not know, with any degree of certainty, that a sinus is or is not thrombosed until we have opened it.

3. That a thrombus may be completely obstructive and yet escape detection; if the clot represents a recent thrombus and is soft, and if at the same time the external wall of the sinus has undergone inflammatory thickening and has granulations upon it, the diagnosis is difficult.

4. The case illustrates one of the dangers which we incur when, having exposed a sinus which for any reason seems suspicious, we return the patient to bed, without opening the vessel in order to await the development of symptoms which point more definitely to the presence of thrombosis. Instead of the symptoms of sinus thrombosis appearing during this expectant interim, a fatal leptomeningitis develops. Had this sinus been suspected it would have been opened at the original operation regardless of the symptoms.

5. One of the dangers of attempting to curette a thrombus from the region of the jugular bulb prior to jugular resection is shown. If, before the jugular resection, the attempt had been made to curette the thrombus from the

bulb, or to extract it with forceps, it would have succeeded; a return flow (coming from either the condylars, the inferior petrosal, or from both) would have resulted, a jugular resection would not have been done, a large portion of the thrombus would have been left in the jugular vein, and the case would have been sacrificed through that error. It also shows that a return flow from the region of the bulb cannot be regarded as a guarantee that the thrombus has been extruded *in toto*.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

STATED MEETING, JANUARY 12, 1905. THE PRESIDENT, DR. GRUENING IN THE CHAIR.

Presentation of an encephaloscope, with suggestions as to its employment; by FRED. WHITING, M.D.

Dr. WHITING said that this little instrument which he had called the **encephaloscope** had been devised for the purpose of simplifying the treatment of brain abscesses. The necessity for some such device had been suggested to him by the condition of every case of brain abscess in his own practice and that of his colleagues which had subsequently come to autopsy. Upon cutting the brain, various paths were found leading from the original abscess cavity, these paths representing false passages where brain reinfection had taken place as the result of the introduction of gauze. Noting this, it had occurred to him that he might devise some method of packing the abscess cavity without causing these false passages. The instrument was much like an ordinary ear speculum, but larger, the extremity being closed by an obturator so that it could follow the abscess cavity without effort and avoid any laceration of the brain substance. As soon as an abscess is opened and the dura divided, the soft brain tissue prolapses toward the opening in the skull, so that, unless you are dealing with a chronic abscess the dense walls of which support the intracranial pressure, the abscess path is almost filled up, and in introducing the gauze dressing one is apt to make false passages. In dealing with a simple superficial abscess of the brain which does not extend deeply into the encephalon the cavity could be followed without danger of making these false passages.

The instrument was used with a head mirror, as in using the ear speculum. It should first be introduced for a short distance only, and then the obturator removed with a slight rotary movement, and at the bottom of the encephaloscope can be seen a meniscus which points toward the abscess, so that the direction of the abscess path can be readily determined. It was a very simple matter, and the abscess path could be followed almost by intuition. The instrument follows very readily, does not lacerate the brain tissue, and when the bottom of the abscess is reached the soft tissue spreads out. If you are in doubt as to whether you have really reached the bottom of the cavity, it can be gently touched with a cotton-covered applicator. The instrument had proved to be of value at the time of operation both for its diagnostic help and its mechanical assistance. Diagnostically it tells you at once whether you are dealing with an acute or a chronic abscess. In the majority of cases that could also be determined by introducing the little finger, but that could hardly be considered a desirable procedure. It was surely better to introduce something which you were sure would not lacerate the tissue, and which could be thoroughly sterilized. Another point at the time of operation was that you could determine definitely whether or not all the pus had been evacuated from the cavity. This was a very important point. On two occasions at least he had opened an abscess and after the first outpour of pus he had made a little expressive pressure against the brain tissue in order to expel still more of it, and when the pus ceased to flow, and he thought the cavity was empty, he had introduced the encephaloscope and found almost as much pus still in the cavity as had already been expressed. He introduced the encephaloscope and withdrew the obturator and the instrument filled up to the brim with pus which he removed with cotton; the instrument was then introduced still farther, and even the third time it filled almost to the brim—using the largest-sized encephaloscope, which would hold over a dram—making about three drams of pus altogether.

Another point in making a diagnosis with the instrument was that you could determine whether you were dealing with a single large abscess cavity or a large abscess path communicating with several other abscesses. With no other means of diagnosis than the introduction of the finger, it would be simply a matter of good fortune to determine a multiple abscess, but with the en-

cephaloscope introduced as described one could examine the path of the cavity from the periphery to the centre, and find without difficulty any additional paths leading from it and communicating with the original abscess sac.

Mechanically, the instrument enabled one to introduce gauze into the abscess cavity without any risk of tearing the abscess wall and carrying infection into healthy brain tissue. The walls of an acute brain abscess are the most delicate anatomical structure with which we come in contact, and in trying to carry in a gauze dressing it is very easy to go through this soft material and make false passages. This danger can be avoided with the aid of the encephaloscope. In the post-operative care of an abscess the instrument is used much the same as at the time of the operation—as a mechanical assistance in dressing the wound without the danger of making false passages, which have been so prominent a factor in the loss of life. It also enables one to carry the gauze to the full depth of the wound without making undue pressure in any particular part of the wound. You simply introduce the wick of gauze through the encephaloscope and then draw the instrument out over the probe, leaving the gauze at the bottom of the wound, and holding apart the abscess walls from the bottom to the cortex. You can also determine when to stop introducing the gauze into the cavity. In his own practice, Dr. Whiting had often felt in doubt about this point, but in dressing the wound with this instrument, after the gauze has been introduced for a certain length of time, there is deposited over the abscess path a layer of fibrin which gradually begins to granulate, and after eight or nine days, up to something like two weeks, the path of the abscess becomes covered with delicate, pinkish, firm granulations, which appear like normal granulations of an ordinary mastoid wound, and when these have become firmly established you are safe in withdrawing all gauze.

The instrument is also of advantage in dressing a chronic brain abscess. He thought that just as decidedly as in an acute abscess you should not pack the cavity firmly, in a chronic brain abscess you should do so. He cited a case where he believed the patient died because he had not at first dressed it properly. He treated the patient as for an acute abscess; in an acute abscess, after the first dressing the discharge that comes from the wound is usually devoid of odor and appears like good healthy pus, but

in the chronic abscess there is a dense plastic wall which on the introduction of the encephaloscope appears like the interior of a cavity possessing firm and unyielding walls. He carried a wick of gauze to the bottom of the cavity and thought that it would close and the material exfoliate or be partly absorbed, but as a matter of fact it did not. Day after day there was a foul purulent discharge from the wound, but he failed to recognize the necessity of discontinuing this mode of dressing and packing firmly until too late in the course of the disease, when the boy appeared not to be doing so well. He could not discover any new abscess, but began to pack the wound with larger amounts of gauze, with the result that the foul odor disappeared very quickly and the amount of discharge diminished. The case, however, had already become infected with meningitis and the boy died. He firmly believed now that if he had packed the cavity and discontinued it gradually, instead of treating it as an acute abscess by a single wick of gauze, there would have been a chance of saving the patient.

As to the results which he had obtained by treatment with this instrument: Some of his patients he had treated with the encephaloscope, the others without it. In the first group, treated without the encephaloscope, two died and one recovered. In the second group were seven patients, some of which had been reported at Washington two years ago. Of these seven cases, six had recovered. In the one group the patients were as strong and as well nourished as in the other, but with the aid of this instrument he had been able to convert his statistics from sixty-five per cent. mortality to eighty-five per cent. of recovery.

Discussion: Dr. MCKERNON said that he had used the encephaloscope with four cases, and could add his testimony to what Dr. Whiting had said. He had found it an advantage in searching the abscess cavity, and in one case would have failed to discover a multiple abscess had he not used the encephaloscope. He thought that possibly it was of even more advantage in dressing the cavity than in searching it, and he knew of no other instrument that would allow the cavity to be packed with such precision with gauze or with a simple wick. Three of his cases had recovered and one died. The one that died had an acute abscess and meningitis ensued. He only wished that he had had the encephaloscope to use in other cases previous to its introduction by Dr. Whiting.

Dr. GRUENING asked if the instrument could be used in cases where the opening of the abscess was over the antrum and where the instrument must be introduced through the lower surface of the brain. He thought that in the treatment of abscess of the brain there were other elements to be considered. Formerly abscess of the brain was treated with rigid rubber tubes and with irrigation, but this was no longer done. His first six cases died; his last four cases lived, because he treated them with gauze and did not irrigate. He had not yet used the encephaloscope, but intended to do so as he thought it a useful instrument. He had noticed that Professor Grunert of Halle speaks favorably of it after reading Dr. Whiting's paper, although he had not actually used the instrument.

Dr. PHILLIPS asked the courtesy of the Section in allowing *Dr. R. F. Held* to present a case of unusually large auditory canals and correspondingly large Eustachian tubes. The prominences were so large as to almost completely block the naso-pharynx, causing all the symptoms of nasal obstruction and adenoids. While up and at his work he seemed to be free from trouble, but at night he was a decided mouth-breather. Turbinectomy had been done on both sides, his adenoids removed, and uvula cut, but the symptoms of obstruction were still present when he came to the clinic for some relief. The right side is slightly larger than the left, the diameter of the canal on that side being over half an inch, in to the annular ring. He requires absolutely no speculum and the entire drum membrane and annular ring are plainly seen without even putting the ear on the stretch.

Dr. WHITING, replying to Dr. Gruening's inquiry as to whether the encephaloscope could be introduced where the opening had been made beneath the base of the brain, said that in the majority of cases the different sizes of the instrument enabled this to be done without difficulty. He had cases where the radical operation had been done, in which the abscess had been the result of chronic suppuration. He had not had cases where the brain abscess had been the result of an acute suppurative process, consequently the radical procedure had been instituted, and in that the roof of the antrum had been cut away, so that the cavity was easily accessible with the small-, and even the large-sized, encephaloscope. He had not happened to encounter a case where the anatomical structure was still in position, but did not think that that would constitute an obstacle to the use of the instrument.

Dr. GORHAM BACON presented a new model for teaching Otology.

He said that he had found some difficulty in teaching students how to throw the light into the canal in examining ears, the patients rebelling against their inexperience. Some years ago he had imported a papier-maché model from Germany, but had not found it exactly what was needed, and had seen in London plaster models of the ear, but these were easily broken and were not practical for use in the class-room. He had, therefore, had this model made by Meyrowitz. It was made of metal, about the natural size of the ear, and was mounted on a firm stand so that it could be raised or lowered. It was also provided with a ball-and-socket joint so that it could be moved in different directions. Then he had about sixty metallic disks which could be inserted in a slot in the canal. He had not had any special illustrations made, he simply cut out the various colored illustrations made by Politzer and others and had them pasted on the disks and found them very useful. The speculum fits readily into the canal. The student can reflect the light into the canal and draw upon the blackboard what he saw. He was having some disks made with an open space in the centre so that gold-beater's skin can be stretched over it, in order to enable the students to practise paracentesis on the drum membrane. He had found the model of great assistance in teaching new classes.

Dr. DENCH said that, knowing Dr. Bacon was going to present his model, he had taken the liberty of bringing one he had obtained from Pfau, of Berlin. He had used this model in teaching his classes at the University and Bellevue Hospital Medical College. The model was essentially the same as the one shown by Dr. Bacon, but was much more crude in its construction. The plates represented the drum membrane, and were introduced in a manner similar to that employed in Dr. Bacon's model. Dr. Dench had found the device of great assistance in teaching students, but was certain that the device presented by Dr. Bacon was much more elegant. The speaker said that, in teaching medical students, he had at one time had the temporal bones removed from subjects and mounted upon an appropriate standard, so that students could, in this way, examine moist specimens of the human ear. The speaker was convinced that Dr. Bacon's model would appeal to all teachers. It gave students every opportunity to learn how to manage the head-mirror, to appreciate the rela-

tive depth at which the drum membrane lies, manipulate structures in the external auditory meatus, and thus to obtain a proficiency of manipulation, which could be secured in no other way.

Dr. BACON replied that he had used the apparatus which Dr. Dench showed, and got his ideas from that and one which he imported from London, but that it did not have a very firm base, was easily broken, and the illustrations accompanying it were not very good. That was one reason why he had not had any illustrations made, but preferred to rely upon those of Politzer.

Dr. DENCH replied that he had merely showed his model as a matter of history.

Dr. HELD presented a new cautery handle and explained its advantages. It is so arranged as to overcome the disadvantage of having to use a handle where the cautery point was in a straight line with the handle, by having a joint at the junction of the handle and the socket for the cautery tip, thereby allowing an angular bend without having to bend the cautery tip. This is especially good in nose work, for the field of operation can be constantly in view. It is also especially adapted for tonsil work by rotating a movable contact point, and with the angular bends could be used on one tonsil and then on the other without any time lost for the adjusting and without twisting or turning the hands, this being accomplished by the mechanism of the handles.

Dr. GORHAM BACON read a paper reporting **two cases of acute otitis media suppurativa, followed by mastoiditis and meningitis, and caused by the diplococcus intracellularis of Weichselbaum.** (Published in full on pp. 191-197.)

Discussion: Dr. LEDERMAN said that hearing Dr. Bacon's history of these cases recalled to his memory three unfortunate cases that he had had to deal with, in which the symptoms pointed to cerebral involvement of a complicated character. After the radical operation the patients' pulse became slower, symptoms of headache intervened, and a slight temperature of 101° to 102° appeared, fluctuating, though never to such a degree as reported by Dr. Bacon, but never falling below 100° . In one of the cases he had been compelled to operate, and opened up the temporo-sphenoidal region, but was unable to find any pus, even after five or six deep punctures. All of these cases, which were characterized by slow pulse and pain in the back of the

head, and symptoms of cerebral involvement without definite local indications, came to autopsy. In three of them no pus was found in the brain tissue, but these proved to be cases of leptomeningitis. In one of the cases the symptoms pointed distinctly to a cerebral involvement, but he was unable to locate it. In another case, which also ended fatally, a man about forty years of age, there was a chronic discharge of the ear with symptoms of mastoid involvement. A radical operation had been performed, but the patient did not seem to do well—his temperature rose slightly and his pulse became slow. Dr. Lederman was called in to see the case and the symptoms seemed to indicate a temporo-sphenoidal abscess. He operated but was unable to find the abscess, although he made four or five incisions in the brain. The patient became better and improved so much that he wanted to get up and go home, but it was thought best to keep him under observation. Nystagmus appeared a week after this operation, and he became comatose. A diagnosis of cerebellar abscess was then made, and the Doctor chiselled from the mastoid wound to the cerebellar region, when as he was about to plunge his knife into the cerebellar region the patient stopped breathing. Later a large abscess was found, but the Doctor thought he had lost valuable time by chiselling posteriorly and going over the cerebellar region. There were no circumstances pointing to the location of the cerebral abscess other than that it was in the cerebral cavity. All of these cases showed very emphatically how difficult it is to make a diagnosis in diseases of the cerebral cavity complicating purulent diseases of the middle ear.

Dr. W. P. EAGLETON read a paper giving a report of **a case of sinus thrombosis followed by infective arthritis of both hips with spontaneous dislocations**; operations; recovery. (Published in full in the August number of these ARCHIVES.)

Discussion: Dr. DENCH said that he had been very much interested in the report of a case of multiple arthritis due to aural infection. He spoke of a case, occurring, last year, in his own service at the New York Eye and Ear Infirmary. The patient had, on admission, an acute otitis, following grip. There was, at this time, some mastoid tenderness. The drum membrane was freely incised, and a bacteriological examination showed the presence of pneumococcus. Twenty-four hours after admission the man developed a double pneumonia, and the condition of his

lungs made it impossible to perform the mastoid operation, although the mastoid was quite tender. This tenderness gradually subsided, the pneumonia ran a regular course, and the patient slowly convalesced. After the temperature, due to the pneumonia, had fallen to nearly normal, the patient began to run a characteristic septic temperature. An examination of the lungs showed nothing to account for this temperature, although Dr. Dench feared there might be an abscess of the lung. At this time all mastoid tenderness had disappeared, and the wound in the drum membrane had entirely healed. Owing to the absence of any lesion of the lungs to account for the temperature, Dr. Dench made the diagnosis of septic thrombus in the lateral sinus and internal jugular. The patient was operated upon: the jugular bulb was found to be filled with a purulent thrombus, although the mastoid cells were perfectly normal. The clot in the sinus was removed, the internal jugular being excised from a point just above the clavicle to a point just below the jugular bulb. The patient did fairly well for four or five days after the operation, but then he began to complain of pains, first in his left shoulder, then in the right wrist, and then in the left knee; the left knee-joint was particularly painful, and was very much swollen. An examination of the clot in the jugular showed streptococci. From the sixth day after the operation, the patient ran a characteristic septic temperature, the temperature varying from 100° to 104°. The blood cultures showed streptococci. The patient finally died from general pyæmic infection.

Dr. MCKERNON told of a case that he had seen last March—a man suffering from scirrhus of the liver with very marked ascites, who developed pain in the left ear at night. He saw the patient the next afternoon, and the ear drum had ruptured. He took a culture of the pus from the canal, which showed the predominance of the streptococci. The man did not suffer much pain for twenty-four hours, but at the end of that time he suffered considerable pain in the opposite shoulder. Dr. Brewer was called in; he aspirated the shoulder and found pus. Two days later, the elbow joint on the same side became affected, and Dr. Brewer opened the elbow and shoulder joints. The ear condition did very well, and the perforation closed in five or six days. The man died, however, a short time after, of myocarditis.

Dr. TOEPLITZ said that seven years ago he had seen a case of otitis acuta in a young man, seventeen years of age. He was

operated upon soon for abscess of the sigmoid sinus and thrombosis of the jugular vein. The sinus was opened, and the jugular vein ligated and excised. A week later, the left-foot joint became involved, the knee three days later, and then the left shoulder; then on the other side, the other foot and the right elbow, and finally, six weeks after the first operation, he had a limited infarction of the left lung and an endocarditis. He finally recovered. The joints contained no pus. Two were opened, but only serous fluid was found. He thought that the case stood on record as one of the most extensive affections of the kind followed by recovery of the patient.

Dr. S. McCULLAGH read a paper on **thiosinamin** in the treatment of **tinnitus aurium** (author's abstract).

The writer reports results obtained in 38 cases:

	Cured.	Much Improved.	Improved.	No Improvement.
OM C C	15	7	4	5
OM P C (resid.) .	5	0	0	0
Ot. Int.	0	0	1	1
Total	20	7	5	6

He draws the following conclusions from his experience:

1. The drug exerts a markedly beneficial action on ear disease, accompanied by the formation of new connective tissue.
2. This beneficial action is due to an increased pliability of this tissue, allowing the usual forms of treatment to accomplish their object better.
3. Its administration should always be combined with the usual forms of treatment—catheter, otoscope, etc.
4. As good results may be obtained from administration by the mouth as hypodermically.
5. Better or more prompt results will be obtained in recent cases.
6. It exerts a beneficial effect on vertigo.
7. Care should be used in looking for contraindications, as tuberculosis, abdominal scars, or any condition where the new connective tissue is serving a useful purpose.
8. Better results are obtained with it in relieving tinnitus than with any drug heretofore used.
9. Its effect on the hearing power is beneficial.

Dr. T. PASSMORE BERENS said that he had been much interested in this drug, and had been watching Dr. McCullagh's experiments and the results obtained, and was inclined to believe that with thiosinamin the profession might hope to be able to relieve some cases of tinnitus for which hitherto no other drug or treatment had availed. He had used it in his own private practice on eight cases, which had showed no improvement from anything that he had been able to do for them, either mechanically or by medication. They were all cases of tinnitus accompanied with considerable deafness. In two of the cases he obtained a very marked improvement from the use of thiosinamin. One case could hear a watch on contact with one ear; in the other ear he could not hear the watch, but heard the acoumeter at three inches. After six weeks' treatment with thiosinamin, this patient could hear the same watch some six inches on the better side, and heard the acoumeter thrice the distance on the other side. The tinnitus was not relieved.

A second case, in which the effect was very marked, was a case of vertigo, tinnitus, and deafness. The deafness and the vertigo were improved, but the tinnitus was not affected. He hoped that some of the gentlemen present would try thiosinamin in some of their cases where other methods gave no improvement.

STATED MEETING, FEBRUARY 9, 1905. DR. GRUENING IN THE CHAIR.

Report of a case of double mastoiditis with extensive involvement of the zygomatic cells. By W. P. BRANDEGEE, M.D. (Published in full in the August number.)

Preliminary report of a case of cholesteatomatous disease, with stenosis of the external auditory canal; extensive destruction of the temporal bone; and external manifestations. With exhibition of the patient. By M. D. LEDERMAN, M.D.

The patient had presented himself on January 16, 1905, and dated his present trouble from December 23, 1904, when the swelling appeared behind the left ear above the plane of the external auditory canal. There had been no discharge from the ear for two years, and no pain. Over the left ear and extending along the temporal region was a large hard growth. Only one point of fluctuation could be detected, and that was over the

region of the mastoid antrum. The patient states that this hard bony prominence has been there since he was sunstruck ten years ago. With the present trouble, he has suffered no pain, little elevation of temperature, and with this extremely large external mass, which resembled at first glance a fluctuating periosteal abscess such as is seen in children, there was comparatively no tenderness over the mastoid tip and no swelling over the lower portion of the mastoid. The external canal was almost occluded by an exostosis of the posterior wall. Above this obstruction a small probe could be introduced for $2\frac{1}{2}$ inches, and on its return it was covered with pus. The interesting features of the case were the marked swelling, slight pain, and abnormally large bony mass occupying the temporal region. A diagnosis was made of chronic suppurative disease, with extensive involvement of the mastoid cells.

The patient came to the Hospital on the next day, January 17th, and was operated upon. In making the usual incision, a large fistula through the cortex was found, through which thick pus oozed. The outer bone covering was a shell and was easily removed, exposing a large cholesteatomatous mass. The disease had extended so far that after curetting the growth from the cavity the descending portion of the lateral sinus was found exposed for $1\frac{1}{4}$ inches. The posterior canal wall had been eaten away, so that nature had already accomplished a Schwartze-Stacke operation. The posterior fossa was exposed. The dura could be seen through an opening the size of a fifty-cent piece. The petrous portion was considerably eroded.

Words fail to give a clear picture of the ravages of the disease in this case, but the members of the Section can see its extent by looking at the patient. In curetting away the cholesteatomatous mass it was found to extend into the Eustachian tube, which opening is readily seen at present through the mastoid wound. The descending portion of the facial nerve was lying in the wound covered with cholesteatomatous masses, but was not protected by any bony covering. As it was impossible to recognize the nerve, some traumatism resulted. A small fistula seemed to lead into the semicircular canal, and this opening was also cleared. The dura of the posterior cerebral fossa can still be seen. The upper bony boundary of the tympanic cavity had all been eaten away, leaving the middle ear and cerebral fossa exposed. The expected facial paralysis appeared on the day fol-

lowing the operation, but except for some dizziness (due no doubt to curetting the fistula which led into the semicircular canal) there was no further reaction.

It is certainly one of the most extensive cases of destruction he had ever seen, and much of the external layer of bone was involved by the cholesteatomatous disease. A limiting membrane surrounded the tumor.

Dr. OPDYKE read the **history of a fatal case of mastoid disease** and requested the opinion of the members regarding the cause of death.

Margaret Van D., aged 4½ years, family history good, and health previous to present illness excellent. For three or four weeks the child had days of seemingly good health and alternating days of moderate range of temperature and a feeling of general malaise. Repeated examination of the blood failed to elicit the presence of malaria or typhoid fever. A slight attack of enteritis early in her illness responded promptly to the proper treatment. None of the exanthemata made its appearance, nor were there any other special symptoms present whereby a certain diagnosis might be made. To be sure, the child had a mild attack of ordinary grippe, of the coryza form, but there was nothing else whereby either the family or their physician could arrive at a satisfactory conclusion. The little patient continued to grow worse, the temperature rose, being now of a remittent type, the pulse keeping well up above 120, restlessness well-nigh continuous both day and night, and anorexia and constipation well marked. Headache was a prominent symptom also, and was mainly of a frontal and occipital character. As yet there were no eye symptoms nor nervous reflexes to assist in a diagnosis. During the fourth week there suddenly appeared a swelling of the anterior cervical gland on each side. Also a markedly active acute otitis media, and within twenty-four hours both drum membranes were perforated and the ears were discharging a virulently purulent pus, which was loaded with streptococci and pneumococci. For the following two days the symptoms were somewhat moderated and the child's general condition improved, although the hearing rapidly grew worse and there appeared eye symptoms. These were photophobia and marked lachrymation, and a slight suspicion of Argyle-Robertson pupils. The restlessness and headache now suddenly increased, and there appeared some rigidity in the muscles of the back of

the neck. The enlarged cervical glands also appeared superficially reddened and the tissues over the left mastoid antrum became swollen, injected, and œdematous, causing the ear lobule to bulge conspicuously forward.

Such was the clinical picture at my first examination. I advised an immediate operation, which was delayed until the following day, at the request of the family. That same night, however, I made a free incision of the left drum membrane, in order that there might be free anterior drainage. The temperature fell to nearly normal on the following morning, and the child seemed a whit brighter. During the afternoon the temperature again reached 104°, the pulse became very rapid and irregular, the migraine almost unbearable, and the restlessness extreme. That same night I performed a radical mastoid (Schwartz) operation. The child died in two days.

All the subcutaneous structures about the mastoid antrum were enormously infiltrated, and the same condition extended well down into the neck. On opening the mastoid antrum, pus in large quantities exuded, and the bone both over and about the same was badly necrosed. All the mastoid cells were found to be in a suppurative condition, and were thoroughly ablated. Neither the sinus nor the tegmen was necrosed, nor was the posterior auricular wall diseased. The aditus ad antrum was filled with detritus and pus, and it, together with the middle-ear cavity, was thoroughly cleansed and drained. The suppurative infiltration of the cervical tissues was found to be superficial and seemingly without any connection with the deeper structure, and for this reason they were not opened or drained. The middle-ear cavity, aditus ad antrum, and mastoid antrum were now thoroughly flushed out, and the latter firmly packed with iodoform gauze.

Outside dressings in large numbers, on account of the advanced local suppurative condition, were now used, and the patient promptly returned to her bed. The time of operation was fifty-one minutes, chloroform was used as the anæsthetic, and the little patient apparently suffered little shock—in fact, she was in far better condition as to pulse and circulation than before the operation. She passed a comfortable night, and on the following morning her temperature was normal and remained nearly so during the day, the pulse also being strong and regular. Her general condition likewise markedly improved, and every-

thing looked remarkably favorable. The second night was also a satisfactory one, and the temperature early on the following morning was but $99\frac{1}{4}^{\circ}$.

At about eight o'clock on this, the second morning following the operation, the child suddenly took a turn for the worse, and rapidly sank. There now appeared all the symptoms of a typical cerebro-spinal meningitis, and death took place at about noon, the earlier stage of excessive irritability being followed by a period of profound coma. This sudden fatal termination was entirely unlooked for, and it is exceedingly difficult for one to determine its cause, especially, too, as no autopsy was permitted. Had there been a later involvement of the sinus, I think there would have intervened a longer period before death. There might have been either a cerebral or a cerebellar abscess present, but no symptoms typical of either appeared, and there was, therefore, no justification for trephining. Inasmuch as the bony walls surrounding the mastoid antrum, the sinus, and the middle-ear cavity were sound and intact, I did not feel in any way justified in further surgical procedure at the time of operating.

Dr. SMITH told of a similar case of a child in his own experience, where the primary operation had been performed before the patient came to the clinic. The case was treated for a few days and a secondary operation was then advised. Granulation tissue and dead bone were found, but otherwise the wound was in good condition. The sinus was explored but no involvement was noted. The dura was also exposed and found healthy. The next day the child had stiffness of the neck and developed high temperature and on the third day died. Autopsy showed cerebro-spinal meningitis. The pathologist was unable to trace the paths of infection, and all cerebral tissue surrounding the wound was normal, as far as could be determined.

Dr. MCKERNON said that he thought the cause of death in Dr. Opdyke's case was meningitis with secondary encephalitis. Probably this condition had been going on for some time prior to the operation. He had seen several cases where the operation was done late, and where without question the infection after the operation had come from poisonous material in the veins passing into and infecting the meninges and cerebral structures. He thought that the development of the symptoms forty-eight hours after operation showed that this was the cause of death, and that

the infective material was already present in the veins at the time of operation.

Report of a case of infective sinus thrombosis, complicated by meningitis, lumbar puncture, and subdural irrigation. By J. D. RICHARDS, M.D. (Published in full on pp. 198-202 of this volume.)

Dr. EMERSON told of a case which had been operated upon with a happy result through an error in diagnosis. The patient was a woman of thirty-nine with a history of fifteen years of chronic catarrhal otitis, with the result that she was almost totally deaf. Early in November she had an acute otitis. A general practitioner had made a paracentesis, and at the end of three days she developed a mastoid case. She was referred to him and was operated for mastoiditis. The sinus was exposed, and because of the discoloration of the wall was incised, but the hemorrhage was free, and there was evidently no clot. It was packed. The temperature remained at 102° until at the end of five days the packing was removed, and she then went on to recovery, and the wound was attended to by an interne, so that he did not see her for some time. Three weeks after the operation, the interne called attention to the fact that she was not sleeping well, had poor appetite, and suffered from headache, and asked him to see her and indicate what should be done. He looked her over, and kept her under observation for five days, during which time the restlessness and sleeplessness increased, and she developed great tenderness over the skull on that side; her temperature never went above 99°, the pulse went down to 54. Two days later she developed a strabismus of the left eye, considerable mental hebetude, pasty look, bad color. The low temperature, low pulse, tenderness, and all associated symptoms led him to think it a case of temporo-sphenoidal abscess. Two or three general surgeons were consulted and were divided in opinion, but with the support of one of them he opened up the wound freely, and resected a portion over the temporo-sphenoidal lobe. The dura bulged into the wound when it was incised, and fluid spurted out for a quarter of an inch, clear in color. There was no purulent discharge, no sign of pus in the brain though he passed the knife in freely in several directions. He drained the wound but did not suture the dural flap. The result was very astonishing and gratifying. The patient improved immediately, was up in a week, and in three and a half

weeks left the hospital. All dressing was removed about ten days ago, and he had seen her in the morning, looking well and in good health. A remarkable feature of the case was that although she had been stone deaf for ten years as the result of the chronic catarrhal process, her hearing had improved since the destruction of the drum, and she can now hear ordinary conversation.

Dr. GRUENING said that Dr. Richards dwelt upon the need of more definite indications in regard to the diagnosis of sinus thrombosis, and then stated that in sinus thrombosis it is best to ligate the jugular vein, even if there is a return current from the bulb. These were interesting subjects for discussion.

Dr. MCKERNON said that he thought all who were doing this work realized how difficult it was at times to determine when the sinus was exposed whether or not it was involved. In some of the cases he had seen, however,—both at the time of the primary operation, and later on when trouble in the sinus was recognized,—there had been distinct and definite points for its recognition. If there was a recent clot formation in the sinus at the time of the primary operation, there was little if any evidence to be obtained from physical signs alone, but if it had gone on for some time the indications were very clear. This would not apply so well to children as to adults, though he had seen the indications in children. One point was the loss of lustre of the dura over the sinus. That has been prominent in many cases. In other cases where a clot has been present and the dura has been exposed, at that point there has been a distinct loss of lustre, and a little grayish discoloration of the sinus. This physical sign has been distinct and marked in a number of cases. In some of the other cases, where the clot had unquestionably remained for a long time, the sinus was distinctly darkened in color.

Regarding the point as to the danger of curetting or disturbing a clot in the bulb, he thought that we had to be guided by the conditions in each case, as no law could be laid down and followed in every instance. Each case was a law unto itself. He had curetted, had passed forceps down to the bulb, had even passed a bent curette into the jugular bulb and removed the clot, obtained a return flow, and the cases got well. It would not do to lay down a hard and fast rule to tie the internal jugular vein. If you have a disintegrated clot with pus present in the jugular

bulb and wipe it out with cotton or gauze, and find little particles of pus coming up from the lower portion, it is dangerous to cut it or manipulate much in the bulb. In such cases the best method was to resect and remove the internal jugular vein. But if, upon exposure, only a clot be found, and no pus be present, even though we do not get a return flow from the vein, it is unwise to resort to jugular ligation in every case, for a fair percentage of these cases recover, when the clot in the sinus and bulb has been removed.

Dr. LEDERMAN told of a case where the sinus was bathed in pus and granulation tissue, was dull, and had no shiny aspect. After cleansing the bone wound thoroughly, the sinus was incised and a free flow of blood followed. No clot was found, and the patient recovered without further complications. He agreed with Dr. McKernon that in individual cases the clinical aspect of the case must be taken into consideration. Dr. Kipp, of Newark, had reported a case he operated upon where purulent disease of the sinus existed, and in which all he did was to open the sinus and cleanse the cavity without disturbing the disintegrated clot in the bulb. The patient made a good recovery with some symptoms of metastasis. There is no question of ligating where we have distinct evidence of septic infection and where the attempt at removing the clot is not followed by a return flow. He recalled a case he reported some time ago where the symptoms indicated complications of the brain and sinus,—slight chills, lowered pus, increased respirations, and septic temperature,—in which the clinical aspect pointed to sinus thrombosis. The sinus was opened without any confirmation of these indications. The patient came to autopsy and proved to be a case of leptomeningitis without other complications. The brain sections showed no other focus. Such a clinical experience shows how difficult it is to arrive at a positive diagnosis.

Dr. HASKINS inquired whether it was the practice of Dr. McKernon and Dr. Richards to open all sinuses that were covered with granulation tissue or where there was a dark area on the sinus, in the chance of finding a clot in the sinus. He recalled many cases where he had uncovered mastoids and found the sinus bathed in pus. Last week in the case of a boy of ten years of age there was a spot over the sinus almost gangrenous in appearance. It had been his practice to leave the sinus alone, and he has never opened a sinus, and has had no ill results from

sinus thrombosis. He would like very much to know the practice of the other members.

Dr. GRUENING said that undoubtedly before the sinus was opened there must be other symptoms besides discoloration.

Dr. MCKERNON said that when the indications were distinct the sinus should be opened, but that he did not open for a mere discoloration unless there were other distinct and definite physical signs.

Dr. GRUENING said that the removal of the clot from the bulb is very frequently indicated and is followed by good results. In regard to the remarks made by Dr. Richardson concerning sepsis there are as many cases on record of sinus thrombosis where the jugular vein was ligated, as where it was not ligated, and the mortality was not greater in the cases where it was not ligated. The statistical records balance very nicely and the question cannot be decided in an offhand way. In some cases it is well to ligate and in other cases it is not indicated.

Dr. RICHARDS said that he thought it was impossible in a great many instances to be certain of the presence of a thrombus within the sigmoid sinus unless the vein was opened; he considered it conservatism to open the sinus when for any reason it seemed suspicious, but replying to Dr. Haskins he would say that the mere presence of granulations upon the sinus wall would not be considered by him sufficient reason for opening the vessel. He considered the attempt to curette the jugular bulb prior to jugular resection a dangerous procedure; and having opened the sinus and slit its external wall down to a point as near the jugular bulb as the bone removal would permit, and getting no spontaneous return flow from below, it was his practice to resort immediately to a jugular resection, without making any attempt to dislodge the thrombus from the bulb. He considered the aspiration of the loosed portion of the clot as a great danger, particularly as the curette blocks the egress of these emboli. In reply to the statement made by Dr. Gruening, he thought we were usually unable to tell the condition of the jugular vein—*i. e.*, as to whether or not it was thrombosed—before the neck was opened.

Dr. WIENER read a paper on **some mooted points in the treatment of protracted cases of acute middle-ear diseases and their complications.** (Published in full on p. 183.)

Dr. MCKERNON inquired what was Dr. Wiener's prognosis in

regard to future hearing where there was distinct evidences of pus in the mastoid. Dr. Wiener had asked whether the complications which sometimes arise are more apt to be diminished or lessened without early operations. Dr. McKernon thought they were diminished, without question, in many instances, though this depended somewhat upon the character of the infection. If the infection were of a certain type,—the streptococcus,—a guarded prognosis should be given, but in the early stages of the disease, with a history or presence of a purulent discharge from the middle ear and the physical signs present, such as a prolapse of the postero-superior canal wall and tenderness over the antrum and tip, these should be considered as definite evidence to go into the mastoid. He believed that pus would be found in every instance, and it was dangerous to allow such cases to go on, hoping that nature would heal and resolution take place. He considered this an extremely dangerous procedure and wished to protest against it. Another point on which he wished to speak was where Dr. Wiener said it was unwise to operate early, and that we should wait until the pus accumulates throughout the mastoid structures and then operate, for if operated upon earlier they do not heal so readily. He did not agree with this, but thought that where there is infectious matter it would heal as quickly one time as another. It was bad practice to allow infectious matter to remain in the mastoid.

Dr. MAY said that there were really two sorts of cases discussed in Dr. Wiener's paper. In the latter part of the paper he speaks of cases in which the symptoms are urgent and in which he himself advises interference after eighteen or twenty-four hours. Here he did not think there was any question among competent men as to the proper time for interference. In such cases the mastoid would not admit of waiting. In cases that did not clear up in the course of a week or two, he thought that waiting was a much more dangerous procedure than the operation itself. He had never seen reports of mischief done by operation that was possibly undertaken too early. As the army officers formerly said about the Indians, "The only good Indian is a dead one," so we might say about a mastoiditis: "The only safe mastoid is an open one." Where it does not yield readily to treatment, the only safe way to treat a mastoid is to open it. The only cases he worried about were those where the family or family physician prevailed upon him to postpone operative inter-

vention. Occasionally a case was operated upon that might have gotten well without operation; he did not believe any good surgeon ever felt he had injured his patient through operation, while all who had observed a sufficient number of cases knew of fatal ones in which the operation had not been performed sufficiently early. The greater the number we see, the stronger is the feeling that, after all, we have been too slow in operating rather than in too great a hurry.

Dr. OPDYKE referred to an article shortly to be published reporting 75 cases of incision of the drum membrane for cure of otitis media, and presenting a conservative estimate of the results. Of that number, 68 of the cases were very young—from six months to five years of age, and they recovered promptly with good hearing and nearly normal drum membrane. Many of these were taken very early, before the drum membrane ruptured, and required but one incision, and that anteriorly. Those already perforated had the posterior crescentic incision. The remaining cases were those of adults, and in two instances the patients were over fifty years of age. In each of these a secondary incision was not done but, on the contrary, a radical mastoid. In each case there was found plenty of pus, and both got well with moderately good hearing and entire closure of the drum membrane. The speaker agreed with Dr. McKernon in regard to the resultant hearing and the relief, both mental and physical, on the part of the patient, and believed that waiting was neither advisable nor safe. We even have a right to do an exploratory mastoid, just as a general surgeon has a right to do an exploratory laparotomy, and we should not long play a waiting game. He did not believe in resorting to a posterior incision of the drum membrane, especially if there were a perforation already present and streptococci in the discharge, but believed in promptly opening the mastoid instead.

Dr. LEDERMAN said that the recovery of many of these cases of acute otitis after incision could be explained by an anatomical fact, as in many cases the level of the antrum is different. In those cases where the pus continues to appear after being wiped out, the antrum is low down, and the floor of the antrum is much below the level of the aditus; here conservative treatment will do no good. He then told of a case of acute protracted otitis which apparently cured up under antiseptic treatment and the patient felt comparatively well, but after three weeks began to

suffer with headache. There was no tenderness or rise of temperature, but the pain was like neuralgia. There were no local symptoms to indicate the necessity of a surgical operation, and only on the eye symptoms did he decide to explore. The veins of the optic nerve were engorged and tortuous. He found but a drop of pus in the antrum, and then came upon an epidural abscess as large as a hazel-nut. There was no clinical picture to indicate the existence of such disease.

Dr. BRANDEGEE said that he wished to add his protest to Dr. McKernon's against the heresy of too conservative treatment. He was convinced that the general trend of opinion to-day is toward early operation, and felt that the patient reported had a very fortunate result. He thought that with the symptoms as stated the patient could justly have blamed the physician if any complications had arisen. Such conditions called for prompt treatment. We should not leave pus in the mastoid bone under suspicion. If the middle ear cannot account for the pus, there must be some involvement of the mastoid. It is not fair to modern otology to turn its back on conservatism, as stated by the writer of the paper.

Dr. GRUENING said that the case related by Dr. Wiener argued against his views. The patient, a young girl of sixteen, remained under his observation until she had symptoms of meningeal irritation. He then decided to operate and laid bare the dura. In ordinary cases of acute mastoid disease the dura is not laid bare. That very fact showed that Dr. Wiener waited too long. Forty-two cases of acute otitis with four mastoid operations and one death are not a favorable statistical record. This is a bad showing for the conservative treatment.

Dr. WIENER said that he had anticipated arousing just such a discussion as had taken place. In regard to being able to report only forty-two cases, out of which number interference had been necessary in only four, he was unwilling to believe that the good result obtained was due to luck or good fortune; rather to the fact that each case was carefully observed and treated upon sound principles. So far as opening a mastoid, and finding nothing, and being satisfied that one has done no harm, such exploratory proceedings are to be condemned. Only those who do not study their clinical ear pictures carefully will meet with such occurrences. There is not one physician in the room who would allow his mastoid to be opened without there being pronounced

indications for such interference. Our patients have the right to demand of us the same consideration. In regard to having waited, in the case reported in this paper, for signs of meningeal irritation before operating, he begged to differ with the speaker who referred to this fact. We know perfectly well that in the simplest forms of otitis media we often meet with such symptoms as nausea and vertigo, which at once disappear after a paracentesis. It needs something more than nausea and vertigo to say positively that we have signs of meningeal irritation. One might as well say that because a patient is suffering from headache he is afflicted with tumor of the brain, one of the most common symptoms of this affliction. He exposed the sinus and dura, as he did in all cases of this kind, to satisfy himself that nothing should be left undone. So far as the case reported not supporting this paper, again he begged to differ. It demonstrated, first of all, that conservatism was the proper measure early in the disease, as there undoubtedly existed no mastoid disease until within about one week before the operation. Furthermore, the successful outcome without complications, after interference, demonstrated very vividly to my mind how far we can employ conservative measures without risk to the patient. So far as changing his tactics, it would require something more than a simple statement of facts before he could be persuaded to do so. He could not believe, with the number of patients reported in this paper, treated as carefully as they could be, constantly under competent observation, that any patient who submitted to this treatment would be placed in any danger whatsoever. He wished again to emphasize the fact that especially in children under four years of age had this treatment showed itself particularly successful, due undoubtedly, as mentioned in the paper, to an anatomical structure which favors drainage. He believed that the science of otology has advanced to such a point that the saying, "Rather operate one case too many than one too few and witness a bad result," is no longer tenable.

REPORT OF THE TRANSACTIONS OF THE OTOLOGICAL SOCIETY OF NEW YORK.

BY DR. ARNOLD KNAPP, SECRETARY.

MEETING OF MARCH 28, 1905. THE PRESIDENT, DR. E. B. DENCH, IN THE CHAIR.

Dr. BRYANT presented a patient showing an **unusual position of the lateral sinus**. The case had been operated upon for chronic otorrhœa and caries. In beginning the operation the sinus was found displaced and unusually far forward, not more than 1mm from the posterior meatal wall. It was therefore necessary in order to continue the operation to proceed according to Stacke and open the antrum from the meatus. It was a case in which the ossicles had previously been removed without relief. The ear was dry in eight weeks. On looking into the enlarged meatus a bluish area could be seen posteriorly and externally which was the sigmoid sinus.

Discussion: Dr. GRUENING said that this was a case where the sinus would unquestionably have been injured in performing the ordinary Schwartze operation, and he had during the past winter encountered a number of cases where the sinus was displaced unusually far forward. He himself was of opinion that it was much safer to open the mastoid from below.

Dr. WHITING thought that this case presented a very remarkable appearance. He was especially surprised to find that the sinus was so blue; there apparently had been no formation of granulations on its surface. On pressure on the jugular vein, he noticed that this bluish area bulged outward distinctly.

Dr. BRANDEGEE presented a little **pocket case of ear instruments** which would be serviceable in emergencies. The case was of metal, and contained a set of specula, a cotton

carrier, six knives fitting into a universal holder, and other instruments. The case was made by Meyrowitz.

Dr. BRYANT presented a **wood carver's gouge** to be used in mastoid operations. He had used this instrument in the above-mentioned case, and thought that it was due to this instrument that the sinus had not been injured. He also attributed the rapid convalescence largely to the use of this instrument through which blows of the mallet on the patient's head had been avoided.

Dr. DENCH, without wishing to disparage this instrument, thought that an anteriorly displaced sinus could be avoided by the instruments with which we were perfectly familiar.

Dr. ADAMS inquired how this gouge was to be used. He himself was a great advocate of the curette.

Dr. BRYANT replied that the surgical use of the gouge was similar to its use in wood-carving. The motion of the cutting edge is slow therefore easily controlled.

Dr. WHITING thought that the chisels were better and that the same motion could be produced with a chisel.

Dr. GRUENING stated that the only accidents which he had seen had been made with a curette. He had seen the brain entered twice with a curette.

Dr. DUEL thought that the chisels could be replaced in a sclerosed mastoid by rongeurs, curettes, and other similar instruments, especially with a view to avoiding concussion, which is of considerable importance in cases of brain complication.

Dr. PHILLIPS was also of this opinion, and thought that other instruments should be used in preference to the chisels.

Dr. ADAMS described two cases of **sinus thrombosis, with excision of the jugular vein**. One in a child, and the other a man of fifty years.

In the first case, "a child." On admission to the hospital, I operated upon him for mastoiditis, and found the mastoid completely broken down and filled with pus. There were some granulations on the sinus, but as there were no evidences of sinus thrombosis I did not open it. Two days later, he had a temperature of 105°. I decided to open the sinus, I found it thrombosed half way back to the torcular and down below the bulb. I did not try to get a return flow from below by means of the curette, as I was convinced that I would be compelled to carry my curette down too far and dislodge some particle that would

be carried in the circulation. I therefore excised the jugular vein from a short distance below the omohyoid muscle; the child made an uneventful recovery.

The second case was that of a man who had fallen from a scaffolding five weeks before. There was made a diagnosis of a fracture of the base of the skull. He was discharged from Roosevelt Hospital as cured. He entered the Eye and Ear Infirmary a few days after his discharge from Roosevelt with a temperature of 104°. Profuse discharge from the right ear, extreme tenderness over mastoid, and with a sinking superior posterior canal wall. At the operation for mastoiditis, the mastoid was found completely filled with pus, and carious bone was found extending back over the cerebellum, where a blood clot was uncovered. This had become infected, and was partly purulent. The dura around about it was also inflamed. This purulent blood clot was removed. The cerebellum over the external auditory canal was uncovered for the space of about one inch in diameter, as the bone here was also carious. Here was found a localized pachymeningitis. Two days later the temperature rose to 105°, the sinus was then explored, and a clot was found extending from near the torcular side, but none from the bulb. The jugular vein was then excised. Patient did perfectly well for a week, then his temperature rose to 103°, and remained so for two days; after that there was gradual convalescing. In both cases the neck wounds were sutured together; they both, however, became infected and had to be opened the second day. After that they were dressed as open wounds. I have given up the scraping of the clot from the region of the bulb with the curette, as I think it is a dangerous proceeding.

Dr. WHITING does not sew up the neck wound in cases where the jugular vein has been excised, as they have always become infected. He thought that, even if the vein was removed, some of the sheath which was infected remained in the wound. He inquired whether pus oozed out from the region of the bulb, or whether the sheath was responsible for the infection in Dr. Adams's case.

Dr. ADAMS replied that there was no pus seen.

Dr. GRUENING always keeps the neck wound open, even if there is fluid blood in the vein, because in his experience this subsequently breaks down. He had observed fifty-three cases of mastoiditis since the first of the year, which included some cases

of sinus thrombosis. They all did well except the diabetic cases.

Dr. DENCH said that in most of the cases where he had excised the internal jugular, the neck wound had been sutured throughout. Primary union had occurred in over half the cases. In a few, it had been necessary subsequently to open the wound throughout its entire length, and in a few others there had been one or two stitch abscesses, the remainder of the wound healing throughout by primary union. He thought that it was a distinct advantage to close the wound by sutures, unless there was so much breaking-down of tissues in the neck as to make the operator feel sure that the wound would become infected. If, subsequently, it was necessary to take out the sutures, no damage had been done by closing the wound primarily. In cases where there was danger of infection from the upper end of the jugular vein, he suggested that the plan recommended by Grunert might be followed—of suturing the upper end of the vein into the upper angle of the wound.

Dr. GRUENING remembered a case in which the temperature rose to 107° . He was afraid that he was going to lose his patient, but on opening up the neck wound, which had become infected, the temperature dropped.

Dr. DUEL was in the habit of leaving the wound open at the bottom and introducing packing. He thought that the appearance was distinctly improved if superficial sutures could be introduced.

Drs. GRUENING and ADAMS had followed out this plan but had not found it sufficient. In cases which are left open by the use of strapping, the cicatrix will be just as little disfiguring.

Dr. MCKERNON reported on a case of **sinus thrombosis with jugular involvement**. A child twenty-six months of age suffered from tonsillitis. Five days later, pain in the right ear. Paracentesis was performed after 12 hours, giving staphylococcus and pneumococcus infection. T. 103° . The temperature was down for 5 days, then rose. Mastoid symptoms were present and an operation was decided upon. At operation only 3 or 4 drops of pus were found in the antrum. The rest of the mastoid was healthy. T. 99° for 8 days, then shot up to 104° . The wound had looked in very fair condition but then did not appear so clean. The sigmoid groove was covered with boggy granulations. These were removed and a wet dressing applied.

The temperature stayed up for 36 hours. At change of dressing it was noted that the granulations had re-formed. A diagnosis of thrombosis was made, and at operation the sinus was exposed. It appeared whitish and yellow inferiorly. Incision at knee. No bleeding at either end. A firm gelatinous clot was removed with curette, producing free hemorrhage. Anteriorly the clot was firm and organized, and after removal perfectly free hemorrhage resulted. The child stood the operation well. No stimulation was necessary. Temperature dropped to 102.6° , then 104° , then to 101.5° . The child was not so well, though the wound looked clean. The temperature suddenly rose to 106° . Though there were no external jugular symptoms, it was decided to expose the jugular vein, and the vein was resected from the clavicle to the bulb. It contained a clot in the upper part. No pus, but softening. The facial vein was also found thrombosed. The sheath was distinctly involved, and was surrounded by completely disintegrated glands. The wound in the neck was left open and transfusion was practised. The child made an uninterrupted recovery. He was of the opinion that if the glands and the sheath were not involved, the wound in the neck could be closed. The pathologist's report shows that the walls of the vein and sheath were infiltrated with staphylococci.

Discussion: Dr. GRUENING mentioned a recent case of sinus thrombosis where he had tied the jugular vein and after incising the sinus and removing the clot profuse bleeding took place from the bulb, showing that the jugular may be involved even if bleeding occurs, and that the recurring flow of blood took place presumably from the petrosal sinus. He thought it was very important to remove the glands in the neighborhood of the jugular vein.

Dr. HARRIS wished to ask Dr. McKernon to state his indications for resection of the jugular vein.

Dr. MCKERNON: If the clot is healthy, pus be absent, and there is a free return flow and no jugular vein symptoms externally, he is inclined not to ligate the jugular vein.

Dr. ADAMS stated that he had given up scraping out the clot from the region of the bulb with a curette as being a dangerous proceeding.

Dr. GRUENING thought that the ligation of the jugular vein if practised in the region of the cricoid cartilage was a very simple procedure.

Dr. MCKERNON, from the experience of his last case, was rather inclined to tie the vein more frequently than he had been in the habit of doing.

Dr. BRYANT spoke of **deaf-mutism following ptomain poisoning**. A child two years and seven months old suffered from gastro-enteritis after eating ice-cream. One week later the child became deaf and dumb, could not walk, and lost co-ordination. The Doctor, because of the aphasia, was inclined to regard this as a process in which the ganglion cells in the brain had been destroyed by the poison.

He also described auditory **illusions** and **hallucinations** of voices occurring, like tinnitus, in chronic catarrhal otitis media. The dependence of the hallucinations on tinnitus is shown by the fluctuating of the hallucinations in the same manner as the tinnitus would fluctuate, increasing at night, in a still place, on stooping, or on lying down. The five cases which had come to the aural clinic had improved very satisfactorily; three had been cured entirely of the voices and had not gone on to the more grave mental alienation which is expected in such cases. The remaining two disappeared from view after showing marked improvement.

Dr. PHILLIPS remembered a case of chronic aural catarrh with diminished hearing and tinnitus. The patient heard trains constantly. There were other signs of hysteria.

Dr. GRAVENING had recently observed a **fatal case of erysipelas**. A woman fifty-six years of age suffered from grippe, headache, discharge from the ear, tenderness over the mastoid process, but no temperature. At operation pus was found in the antrum, the tip involved. The sinus was superficially placed. The overlying bone was removed. The sinus appeared perfectly healthy. Two days later, the temperature rose to 103° , with an erysipelatous rash about the upper angle of the wound, with vesicles on the auricle. The pulse was irregular, and there was diarrhoea. T. 105° . The patient was irrational. The erysipelas continued to spread and involved the other ear. Pulse 120, respiration 20. The patient became comatose and died from paralysis of respiration.

At autopsy sinus thrombosis and abscess of the cerebellum were found present. The symptoms of these most important complications were completely masked by the attack of erysipelas.

Dr. ARNOLD KNAPP stated that Macewen mentions a form of sepsis characterized by gastro-enteritis and an eruption.

Dr. TOEPLITZ remembered a patient, upon whom he had performed the radical operation, who, four days later developed an attack of erysipelas and died on the tenth day with symptoms of meningitis.

At autopsy a purulent meningitis and superficial ulceration of the brain were found.

Dr. MCKERNON said that the paralysis of respiration in Dr. Gruening's case was somewhat similar to one which he had observed three years ago in a patient on whom he was about to operate, where the respiration ceased and the pulse remained good. Though artificial respiration was kept up for many hours, the case died.

At autopsy a temporo-sphenoidal abscess was found which communicated with the posterior cranial fossa.

Dr. GRUENING spoke of similar symptoms being produced by cerebellar abscesses.

Dr. TOEPLITZ described a radical operation which he had performed, where there was considerable swelling and reaction produced from the use of iodoform gauze in a patient with apparently an idiosyncrasy for iodoform.

He also related a case of acute mastoiditis where after paracentesis the symptoms were relieved except the tenderness over the mastoid. The Schwartz operation was performed and the patient did perfectly well for seven weeks, then very violent headache set in. Another paracentesis was followed by profuse discharge. He examined the fundus of the right eye and thought that the disk was swollen. The headache continued for three weeks. The wound presented some swelling in its inferior parts. Another operation was performed and nothing was found. Subsequently a swelling appeared in the canal, which was opened and an enormous quantity of pus was evacuated. The patient then recovered.

Dr. HARRIS: In regard to the profuse discharge after acute otitis being an indication for the mastoid operation, Dr. Harris wished to relate the case of a man nineteen years of age, where at the opening of the drum all the symptoms were relieved except the otorrhœa, which continued in large quantities for six weeks. There was a slight sagging of the canal wall. The patient got well without any operation.

Dr. BERENS spoke of a case with **mastoid symptoms after a head injury**. The patient had fallen on his chin, with bleeding from the ear, no cerebral symptoms but shock. The drum membrane was found ruptured, but the canal walls were normal. Seven days later, pain in mastoid. Next day, chill and fever, with swelling behind and below the mastoid process, with a small furuncle on nape of the neck. Temperature 103.5° ; respiration 24; pulse 130. Patient extremely restless and complained of headache and pain in back of neck. Owing to the possibility of there having been a fracture of the base, it had to be decided whether mastoiditis was present, and an exploratory operation to be made. The mastoid process was found healthy, but there seemed to be numerous hemorrhages and serum. Four days later, the patient suffered from a chill, temperature rose to 103° , a red spot appeared on the opposite cheek, which increased in size and developed into an ordinary boil. Uninterrupted recovery. The case is of interest in connection with the discussion of erysipelas earlier in the evening.

Dr. HASKINS was reminded of a case somewhat similar, where the patient had fallen on her occiput, was partly unconscious for some minutes, and later suffered from pain. There was a hemorrhage in the drum membrane. Two weeks later, a swelling appeared behind and below the ear, with vomiting. The ear itself was apparently normal. T. 102° . The patient at his suggestion was admitted to the hospital for observation. An ice-bag was applied to the mastoid process and calomel was given internally. A paracentesis was performed and some serum escaped. The pain was soon relieved and the patient recovered.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE SECOND QUARTER OF THE YEAR 1904.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY.

112. Iwanoff. On several topographical changes in the temporal bone depending on the form of the skull. *A. f. O.*, vol. lxi., p. 76.

113. Wittmaack. On the demonstration of medullary nerve sheaths and of medullary envelopes of ganglion cells in the auditory nerve. *A. f. O.*, vol. lxi., p. 18.

114. Courtade. History of the anatomy of the ear. *Arch. internat. d'otol.*, etc., 1904, p. 881.

115. Chalupecky. On colored hearing. *Wien. klin. Rundschau.*, No. 21, 1904.

116. Bukofzer. On the influence of narrowing of the "insertion tube" on the pitch of a tone. *A. f. O.*, vol. lxi., p. 104.

112. After measuring fifty-five skulls in which there were many pronounced dolicho- and brachy-cephalic ones, the author comes to the following conclusions:

1. The measure of the base of the skull differs only slightly in the various forms of the skulls. The base of the skull does not at all depend upon the form of the skull.

2. The rotation of the pyramids is greater the deeper the transverse sinus dips into the mastoid process. A connection between relative shortening of the base of the skull and rotation of the pyramids does not exist.

3. The floor of the middle cranial fossa is situated in dolicho-cephalic skulls in all its parts at the same level; in brachycephalic skulls it is externally deeper than internally.

4. The transverse sinus is situated in brachycephalics more externally though not more anteriorly than in dolichocephalics.

5. There is absolutely no constant index for displacement of the sinus.

6. Some temporal bones present a remnant of the squamo-mastoid fissure in the form of a sulcus running along the parietal incisure, or in the form of a depression or a series of openings.

7. The mastoid processes in dolichocephalics are generally pneumatic (Koerner).

8. Dehiscences in the tegmen were not found in any of the dolichocephalic skulls (confirming Koerner's investigations).

9. In dolichocephalics the opening of the meatus is circular, while in brachycephalics it is more horizontally oval (confirming Ostmann's statement).

HAENEL.

113. WITTMAACK has been able to demonstrate medullary envelopes in the case of the ganglion cells of the spiral ganglion in guinea-pigs. He used a special method for preparing the specimens, which consisted in a freshly made Mueller-solution with 10 % formalin and 3-5 % acetic acid, then 2-3 % nitric-acid-formalin solution. The sections were stained in 2 % osmium and 5 % pyrogallol-acid solution. A bluish-black margin surrounds the axis-cylinder of the nerve-fibre and ganglion cells. After staining with Weigert's chromatin solution, the neurokeratin framework in the envelope of the nerve fibre as well as of the ganglion cells is distinctly visible.

HAENEL.

114. A short historic survey on the development of the anatomical knowledge of the human ear up to the beginning of the nineteenth century.

OPPIKOFER.

115. The article begins with a description of the development of the theory of colored hearing and the citation of old histories. In each case the light sensation occurs when the hearing is stimulated in a certain definite manner, or when through a particular reminiscence a similar stimulation is produced. A personal observation follows. The colored hearing occurred in a patient five years of age as she began to play the piano: *c* was yellow, *d* pink, *e* pale green, *f* gray, *g* light brown, *a* dark brown, *b* black. The colors were similar on the various days of the week. The vowel *a* is dark, *e* green, *i* whitish, *u* bluish-gray. The consonants are colorless. Of the numbers, 5 is red, 6 and 9 equally green.

In order to hear colors, a kind of disposition is necessary which can be explained by changes in the organism or in anatomic variations.

The theory of double perception is discussed from its anatomic foundation. The double perception is simply regarded as a sign of hyperæsthesia of the cerebral cortex—in other words, a cortical hyperæsthesia. As peculiarities of temperament are inherited, so may colored audition be inherited. Similar sensations were produced after poisoning by alcohol, haschish, and santolin. The author regards this double perception as a moderate variation of a physiologic condition, resulting in an augmentation of normal sensations following increased excitability of the brain.

WANNER.

116. BUKOFZER has determined by graphic notation the pitch of the tones which were sung on a broad and narrow tube, and shows that in the well-known experiment of Spiess the tone is changed in regard to its number of vibrations and not in its clang tint as Barth says. The difference in the pitch varies in the author's experiments about half a tone and in some cases almost an entire tone.

HAENEL.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

117. Ferreri. *Report of the Oto-rhino-laryngological Clinics of the Royal University in Rome*, i., 1903, Verlagsbuchhandl. G. D. Antonis, Rom.

118. Haug and Thanish. *Report of the Royal University Ear Clinic in Munich*, 1903.

119. Strubell. Statistics and reports of the year 1903. *M. f. O.*, 1904, No. 4.

120. Stein. The limits of deafness. *Nordisk medicinsk Archiv*, 1903, part I, chap. iv.

121. Freund. On the value of early examination of the ears for the determination of liability after accidents. Heilanstalt für Unfallverletzte, Breslau, 2, *Wissenschaftliche Mitteilungen*.

117. In this report, the important cases which occurred during the year 1903 are not only described, but the various articles which have been published by the physicians and students of the clinic during the past year are added. The report thereby gains greatly and is most readable.

RIMINI.

118. Report of the attendance at the Polyclinic during the year 1903.

HAENEL.

119. The author has employed lactate of yohimbinum to produce anæsthesia for small operations, and confirms the experience of others that the swelling tendency of this agent on the mucous membrane was of value in the removal of hypertrophic mucous membrane of the lower turbinal. The beginning hemorrhage was severe though no secondary hemorrhage occurred.

In the atrophic processes of the nasal mucous membrane the use of yohimbinum is apparently without advantage.

Experiments with euguform as a powder after operations on the nose show that it acts as a hæmostatic and as a disinfectant.

PIFFL.

120. STEIN describes the difficulties encountered in determining the loss of earning power in the deaf. This determination would be very much facilitated if it were possible to know the amount of hearing required to fulfil the various professions. The author has himself collected 312 cases of deafness, and has divided them into small groups as Zwaardemaker did, leaving out of account the first group, which includes the professions for which no hearing is required. There then remained four groups. The required hearing power is given for each group, which was determined after noting the greatest hearing distance which was complained of; and the shortest hearing distance which was not complained of; the intermediate value gave the necessary hearing distance. The hearing for whisper was as follows: For those who had no particular use for their hearing, but required enough to be able to get along on the street, at least 100cm. For women in various callings 150cm, while male workmen require a much better hearing. Laborers working in groups, 200. For government employés, 300 to 700. Finally, a hearing power of over 700cm was necessary for school children, physicians, musicians, midwives, etc.

MOELLER.

121. The author, a neurologist, demands that the practising physician should examine the ears immediately at the time of the first examination of an accident case. This is unquestionably necessary in those cases in which a concussion of the head or a general concussion of the body occurred. The importance of an early examination of the ear in the various forms of traumatic neurasthenia is emphasized. In traumatic hypochondriasis the

early examination of the ear is without importance, but in the case of hysteria a knowledge of the condition of the ear first points to the possible diagnosis of hysteria. Though the diagnosis of traumatic neurasthenia is little aided by an early examination of the ear, this is of the greatest importance in the concussions of the head, in which conditions of neurasthenic irritability, especially of vasomotor nature, develop. The symptoms of a lesion of the labyrinth impress upon the indefinite nervous symptoms the mark of a traumatic case. In a case reported by FREUND four years after the accident, a lesion of the labyrinth was determined by an aural examination. Finally, the importance of the treatment of those injured by accidents is entered upon in which the early diagnosis of an aural complication is made.

SUCKSTORFF.

b.—GENERAL PATHOLOGY.

122. **Koerner.** Tuberculosis of the ear and of the temporal bone. *Handbuch der Therapie der chronischen Lungenschwindsucht*, herausgegeben von Dr. H. Schröder und Dr. F. Blumenfeld.

123. **Kingsford.** The channels of infection in tuberculosis of childhood. *Lancet*, Sept. 24, 1904.

124. **Blau.** Experimental studies on changes in the ear after poisoning with salicylate of soda. *A. f. O.*, vol. lxi., p. 220.

125. **Hammerschlag.** On disturbances of hearing in children and their relation to the psychical and intellectual development of the child. *Wiener med. Presse*, Nos. 14, 15, 1904.

122. After a short introduction, the author describes the development of tuberculosis of the temporal bone of the ear, then extension from the primarily diseased area to other parts of the ear and of the temporal bone, the mixed infections, and the extension of the morbid process from the ear and temporal bone to the interior of the skull and the general organism. In the chapter on clinical course and diagnosis, a case is described of nodular tuberculosis of the auricle and one of tuberculous perichondritis (Haug). In the chapter on tuberculosis of the middle ear and of the temporal bone, the well-known classical picture is described where a tuberculous suppuration in the middle ear occurs in the final stages of chronic pulmonary tuberculosis (painless onset, multiple perforations, roughened bone, etc.). Surgical intervention is not to be recommended at this stage. Thus far no results have been obtained in tuberculin injections; hydrogen peroxide, iodoform, and insufflations of boric acid with a protective bandage

is the only treatment. In the stationary form of phthisis and even before the appearance of any clinical symptoms of pulmonary tuberculosis, tuberculosis of the ear and of the temporal bone may develop without any pain. On the other hand, the so-called atypical forms may come on with pain. Seven personally observed cases of this so-called atypical form are described, which are usually observed in cases of tuberculosis in children and young adults which run an acute course. The conditions found at operation were not always at first glance suggestive of tuberculosis. A peculiar condition which the author observed twice was the softening of the entire spongiosa while the lamina vitrea remained intact. The infection in all of these seven cases occurred presumably through the blood-vessels. One case is of interest which recovered notwithstanding an eruption of nodules on the wall of the sinus. There are five recoveries among the seven cases. Treatment consisted in the thorough removal of the morbid processes, which did not always require the radical operation. The treatment was iodoform and general. As Grimmer has observed the extension of tuberculosis from the pharyngeal tonsil to the tympanum, and as tuberculosis of the pharyngeal tonsil cannot always be clinically determined, the removal of the hypoplastic pharyngeal tonsil can be regarded as a prophylaxis against aural tuberculosis. Finally, all cases of otorrhœa occurring in patients with tuberculous ulcerations of the nose and naso-pharynx should not be regarded as tuberculous. In a short chapter on tuberculous diseases of the labyrinth, the author states that of the so-called labyrinth symptoms only severe deafness is apt to be present. The rare occurrence of miliary tubercles in the auditory nerve in tuberculous meningitis is of no particular importance.

SUCKSTORFF.

123. Of 339 cases, infection occurred : through the fauces in 5, through the middle ear in 4, through the pharynx in 4; total 13.

ARTHUR CHEATLE.

124. Similarly to Wittmaack's experiments with quinine poisoning, BLAU has been able to show, after numerous animal experiments, that after salicylic acid the changes in the ear consist in definite disturbances of the ganglion cells, in the spiral ganglion and in the vestibular ganglion, but that hemorrhages should be regarded as secondary.

HAENEL.

125. The author gives extracts from the various writings of

Bezold on the examination of schools, functional examination, and deafmutism, and adds theoretic considerations on the duty of the school physician and the place of deaf children in schools. School children, according to the author, should possess a hearing power of 4m for ordinary conversation. Children with poorer hearing can be sent to school, but should be dismissed if after a certain length of time they are not able to keep up with the normal-hearing children. Deaf children should be instructed in special classes for the deaf, or, if instruction from mouth to ear is impossible, should be admitted to deaf-mute institutions. The school physician should, at the beginning of the year, examine all the children for their hearing and the condition of the drum. If the children do not get along at school, these hearing examinations should be repeated frequently throughout the year, and every child after recovery from an acute infectious disease should again have its ears examined.

WANNER.

C.—METHODS OF EXAMINATION AND TREATMENT.

126. **Ostmann.** Clinical studies on the analysis of disturbances of hearing. Part II., on the analysis of disturbances of hearing by obstructing cerumen. *A. f. O.*, vol. lxi., p. 116.

127. **Bing.** On localization of tone perception. *A. f. O.*, 1904, No. 5.

128. **Juergens.** Additional investigations on the diagnostic importance of the rhodan reaction in the saliva of ear patients and in some other diseases, as well as on the presence of ptyalin in the saliva of ear patients. *M. f. O.*, 1904, No. 5.

129. **Pick.** A simple electric examining lamp. *Münchn. med. Woch.*, 1903, No. 42.

130. **Richter.** A new instrument for the massage of the middle ear and a manometer apparatus to examine and treat tension of the drum membrane and sclerosis. *Wiener klin. therapeutische Wochenschrift*, No. 20, 1904.

131. **De Lavarenne.** Prophylaxis in the treatment of deafness. *La presse médicale*, 1904, p. 369.

132. **Rosenfeld.** An improved tonsillotome. *Deutsche medic. Wochenschrift*, No. 19, 1904.

126. Eight ears were examined according to the old Conta's method and eight others with the objective hearing measure. The hearing was found diminished in 56% in the higher, in 68.7% in the lower limits. The higher the lower limit of hearing was advanced, the greater was the diminution of hearing for the deepest tones of the pathologically diminished range. The same relations appear to exist for the upper-tone limit. The defect of the upper tones from cerumen, according to the author, is not to be

regarded as a labyrinth symptom nor due to the associated vertigo. He is more inclined to regard this defect as the result of a disturbance of the resonance in the auditory canal. The hearing tests showed the same curve in disturbances of the hearing from cerumen and can be regarded as a perfectly definite form. These tables of hearing examinations can only be applied to forks which resemble his own.

HAENEL.

127. The author considers some of Urbantschitsch's observations in the light of his own theory. The article is interesting but not suited for a short review.

PIFFL.

128. The author has continued the investigations which he published in 1901, and gives the results of fifty-three additional cases. His conclusions are practically as follows:

1. The distinct presence of rhodan in the saliva from the parotid shows definitely that the middle ear is healthy or only very slightly affected.

2. The absence of rhodan reaction shows that middle-ear disease is a very severe or chronic one if affections of the general organism can be excluded.

3. The diminution of the rhodan reaction shows a fair degree of infection of the same side, and is a good gauge of the intensity of the morbid process. In the course of an ear disease the reappearance of the rhodan shows a favorable course and absence an unfavorable one.

4. In an old middle-ear trouble, viz., dry perforation, the absence of the rhodan reaction shows (a) that the tympanic structures are destroyed, or (b) that the disease has not come to a stop and is apt to recur, and (c) a return of the reaction shows that the diseased process in the middle ear has surely ceased.

5. As the rhodan reaction can be tested even in cases where otoscopy is not possible, and on account of the above-mentioned reasons, it is of considerable aid in diagnosis and prognosis in middle-ear disease.

PIFFL.

129. The lamp of a 16-candle-power light is covered with plaster, leaving an opening of about 5cm in diameter. The crown lamp, which the reviewer has described (*Münchn. med. Woch.*, 1904, No. 2), seems to be better.

SCHEIBE.

130. The author describes an apparatus which seems to be principally to act by suction. The apparatus resembles a syringe, consisting of a rubber bag which is distended by a screw after

introduction into the auditory canal. By attaching this to a motor a vibratory massage can be exerted upon the drum.

With this apparatus in chloroform narcosis in deaf-mutes or the very deaf, a lessening of the ankylosed joints is possible, according to the author. With the aid of a manometer, which was connected with the apparatus, it was determined that the drum can stand a positive pressure of 1 and a minus pressure of $\frac{1}{2}$ atmosphere. Larger variations in pressure are painful. The former instrument is put into the hands of the patient and can be used two to three times every day.

The results are not favorable even with this apparatus in old cases. In the three reported cases the benefit in recent cases seems also to be doubtful.

WANNER.

131. Certain springs of Luchon give off sulphur vapors, on contact with air, which can be received in glass vessels. On inhaling these vapors through the nose and mouth, and after introducing them into the middle ear with a catheter, an unusual beneficial action seems to be exerted on those ear diseases which result from an affection of the naso-pharynx.

OPPIKOFEK.

132. ROSENFELD objects to the tonsillotomes which are most in use and which resemble the Fahnenstock or the Mackenzie, because it is not possible to remove both tonsils without changing the grasp of the instrument. This change of the grasp is very inconvenient and makes the operation unnecessarily difficult. Moreover, the usual tonsillotomes are difficult to disinfect and keep from rusting. Rosenfeld has constructed a tonsillotome with a double-cutting knife and a protecting guard. The writer believes that a double-cutting knife is perhaps an improvement, but he remembers perfectly well that the late Professor Stoerk, of Vienna, was able to remove both tonsils with a Fahnenstock instrument without changing the grasp; nor as regards the disinfection of the instrument does the new model of Rosenfeld offer any advantage.

NOLTENIUS.

d.—DEAFMUTISM.

133. Alexander. On the pathology of congenital deafness. *A. f. O.*, vol. lxi., p. 183.

The labyrinth of a deaf-mute patient, thirty-five years of age, who died of pyæmia was examined, and showed the following conditions:

Atrophy of the auditory nerve and all of its ganglia; atrophy of the static nerve terminals (macula utriculi, macula sacculi, cristæ ampullares); atrophy of Corti's organs, especially of the sensory epithelium; circumscribed atrophy and degeneration of the spiral ligament of the crista spiralis and of Corti's membranes; deformity of the membranous canal of the cochlea; arrest of development of the capsules of the cochlea. The most remarkable changes were found in the bony cochlea. The individual features should be read in the original paper. It is of considerable interest to observe the similarity and partial coincidence of the anatomical conditions, especially of the vestibular apparatus, with the conditions found in deaf-born cats and dancing mice.

HAENEL.

EXTERNAL EAR.

134. **Koerner.** On herpes zoster oticus (herpes of the auricle with paralysis of the auditory and facial nerves). *Münchn. med. Wochenschr.*, 1904, No. 1.
135. **Haug.** Anthrax pustule in the auditory canal. *A. f. O.*, vol. lxi., p. 275.
136. **Barth.** External ulcerating otitis. *Deutsche med. Wochenschr.*, No. 17, 1904.
137. **Bar.** External hemorrhagic otitis. *La presse oto-laryngologique Belge*, 1904, No. 5.
138. **Ferreri.** On exostosis of the external auditory canal. *Arch. ital. di otol.*, etc., xv., No. 5.
139. **Guarnaccia.** A new method to cure otomycosis aspergillina. *Arch. ital. di otol.*, etc., xv., No. 4.
140. **Halász.** A case of a foreign body extracted from the ear with hydrogen peroxid. *A. f. O.*, vol. lxi., p. 102.
141. **Buerkner.** A case of destruction of the drum membrane from lightning. *Berl. klin. Wochenschr.*, 1904.
142. **Ménière.** Rupture of the drum caused by the blow of a hand on the ear. *Arch. internat. d'otol.*, etc., 1904, p. 811.
143. **Urbantschitsch.** On the etiology of pearl-like epithelial structures on the drum membrane. *A. f. O.*, vol. lxi., p. 24.

134. The disease occurred in a patient who had been operated upon for a cancer of the breast. The paralysis of the facial and auditory nerves was not complete and improved rapidly. There is no mention made of vertigo or tinnitus. The author believes the disease extended from the trigeminus by anastomosis to the facial nerve, and from the latter in the porus acusticus to the adjoining auditory nerve.

SCHEIBE.

135. The author observed in a veterinary surgeon who had infected his arm with anthrax, that after the development of an extensive furuncle two small pustules appeared in the auditory canal, which healed without suppuration but were found to contain anthrax spores.

HAENEL.

136. BARTH has observed in the course of years a disease of the auditory canal which at the beginning resembles the ordinary furunculosis, but differs in its subsequent course, so that he is inclined to regard it as a peculiar disease and gives it a new name. The main difference consists in the way in which the disease reacts to the treatment which Barth is in the habit of giving in furunculosis. The canal is tightly packed with gauze moistened in bichloride of mercury, and the formation of furuncles is either prevented or after the evacuation of the necrotic plugs the disease heals rapidly, while in the external ulcerating otitis furuncles are not formed, but small painful excoriations appear, which do not heal under the ordinary treatment. In these cases ointments should be applied from the beginning.

NOLTENIUS.

137. BAR reports two cases of this rare disease which is only mentioned in Politzer's text-book. It is characterized by hemorrhagic vesicles in the bony part of the auditory canal, accompanied with severe symptoms. On the lower and occasionally on the posterior wall there are small dark brown tumors, which are soft and elastic, rupture easily, and evacuate blood. The cause is obscure and the inflammatory character of the disease cannot be explained. This hemorrhagic otitis occurs in injuries to the ear, in congestions of the vessels of the head and of the neck, in severe infectious diseases, and in severe general diseases, as scurvy, diabetes, and nephritis. Schwartze has observed in severe middle-ear inflammations hemorrhagic vesicles in the external canal.

The disease reaches its acme in three days and heals in from eight to fourteen days. Relapses are not unusual, though recovery is the rule. The function is usually restored, though the process should be treated with respect as severe infections may follow.

The treatment consists in opening the blebs and using some fluid antiseptic solution.

BRANDT.

138. After stating the etiology, frequency, and symptomatology

of exostoses of the external auditory canal, two cases are reported in which the exostoses were removed by operation. The tumors were examined histologically. RIMINI.

139. Three cases of otomycosis were treated with hydrogen peroxid. The result was so prompt and satisfactory that the author recommends the treatment for these affections.

RIMINI.

140. Instillations of hydrogen peroxid were made on account of the associated otorrhœa, and succeeded in removing the foreign body which had previously resisted all attempts at removal with the syringe. The author recommends this method for cases in which syringing does not succeed. HAENEL.

141. A perforation as large as a pea; the destroyed portion of the membrane collected together about the handle of the hammer so that it appeared as if surrounded by an uneven protruding mass. Coagula of blood were present on the handle of the hammer and the margins of the drum membrane; the tympanic mucous membrane smooth and dry. Four weeks after the traumatism, an exudative inflammation took place, which persisted for three weeks and then recurred. The perforation healed in three months. MUELLER.

142. In contradiction of the generally accepted rule of abstaining from all local treatment in cases of rupture of the drum membrane, MÉNIÈRE recommends spraying with hydrogen peroxid solutions. OPPIKOFEK.

143. According to URBANTSCHITSCH, the cause is a dissemination of epithelial elements in the substantia propria of the drum membrane, usually of traumatic origin after paracentesis. In regard to their origin the epithelial pearls of the drum membrane are like the so-called dermoid cysts of Winiwarter. The author has observed a case in which, after paracentesis in the course of the following year, three epithelial pearls occurred in the incision of the drum membrane. HAENEL.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

144. Hartmann. The treatment of acute otitis media with 10 % carbolic-acid glycerin. *Deutsch. med. Wochenschr.*, No. 17, 1904.

145. Lermoyez, Lubet-Barbon, and Moure. The treatment of acute otitis media. *La presse médicale*, 1904, p. 284.

146. Geronzi. Pyæmia of the otitic region without sinus phlebitis. *Arch. ital. di otol.*, etc., vol. xv., No. 4.
147. Gradenigo. On paralysis of the abducens nerve of otitic origin. *Arch. ital. di otol.*, etc., vol. xv., No. 5.
148. Citelli. On paralysis of the abducens nerve of otitic origin and its clinical significance. *Arch. ital. di otol.*, vol. xv., No. 5.
149. Mongardi. A case of paralysis of the abducens nerve of otitic origin. *Arch. ital. di otol.*, etc., vol. xv., No. 5.
150. Trifiletti. Infections of the mastoid in the course of scarlet-fever. *Arch. internat. d'otol.*, etc., 1904, p. 807.
151. Day. A case of infective thrombosis of the lateral and sigmoid sinuses. *Annals of Otol.*, March, 1904.

144. Heine has stated that the instillations of 10 % carbolic-acid glycerin have one disadvantage, inasmuch as they obscure the picture of the drum membrane. In one case the drum presented a brownish appearance, like a mild eschar. HARTMANN believes that both of these observations were of accidental conditions, and that they have led to incorrect conclusions. In the case of children especially, the instillations of this agent sometimes act almost like a charm. The remedy not only relieves the pain, but even the healthy ear can stand a much stronger solution. In cases of severe inflammations, if this agent only produces a transient improvement, paracentesis of the drum should be performed.

NOLTENIUS.

145. In acute catarrhal otitis media, these authors recommend rest in bed, warm compresses, and instillations of from 2½ to 10 % of carbolic-acid glycerin solutions. Paracentesis is indicated when the pain continues in place of considerable fever or decided diminution of hearing. In acute purulent otitis, the gauze which is introduced into the canal is changed once a day and a bandage applied.

OPPIKOFER.

146. In the four cases reported, intense chills and pain in the joints were present. In one case the mastoid process was opened, but as the findings were negative the sinus was not exposed. All four cases recovered.

The diagnosis of aural pyæmia without sinus phlebitis was made in these cases, because the patients were comparatively comfortable in the afebrile intervals, and only moderate metastatic symptoms were present.

RIMINI.

147. GRADENIGO observed paralysis of the abducens nerve on the same side in six cases of acute otitis media. One case succumbed to meningitis. From the similarity of the symptoms

in all of these six cases, the author believes that there is a distinct symptom-complex which follows an acute otitis media, with severe and persistent pain in the diseased ear and in the corresponding half of the head, and is later characterized by the appearance of the paralysis of the abducens nerve at an interval of between three and six weeks after the onset of the otitis.

RIMINI.

148. CITELLI reports a case of acute otitis media in which the characteristic symptom-complex, as described by Gradenigo, was present (intense persistent headache, paralysis of the abducens nerve on the same side).

Recovery took place after about two months without any operation.

RIMINI.

149. A patient, sixty-two years old, six weeks after the beginning of an acute otitis media, suffered from sudden and severe headache after vertigo and diplopia produced by paralysis of the abducens nerve. Recovery after one month.

RIMINI.

150. A boy, eight years of age, was taken ill with a left-sided acute purulent otitis and empyema of the mastoid process. After operation, uneventful recovery. Seven months later, the boy had scarlet fever. Two days after the onset of this disease, there was a collection of pus under the retro-auricular scar, which opened. The wound closed after one month. It is rather strange that the author, notwithstanding diligent search in literature, was unable to find a similar case recorded.

OPPIKOFER.

151. An acute otitis, with pain and otorrhœa of short duration. Emaciation and continued temperature. Operation showed no disease of the mastoid cells, but thrombosis of the sigmoid sinus. A complication of abdominal symptoms occurred, simulating an intercranial extension of the infection.

BRYANT.

b.—CHRONIC PURULENT OTITIS.

152. Friedrich. Anatomical findings in suppurations of the labyrinth. *Münch. med. Wochenschr.*, 1904, No. 5.

153. Pagnat. On ossified polypi of the ear. *La presse oto-laryngologique Belge*, 1904, No. 6.

152. The histological findings in six cases of suppuration of the labyrinth secondary to middle-ear disease are described by the author. It is not stated whether the original trouble was

acute or chronic. In three or four cases the disease extended through the oval window. In one, well-marked fistulæ were present in the labyrinth capsules. They were usually secondary to disease of the semicircular canals.

The author does not bring any anatomical demonstration of the labyrinth fistulæ without pus which are frequently found mentioned in literature and depend upon incorrect observations during operation.

The inflammation in the labyrinth extends first to the perilymphatic space and then invades the endolymphatic cavity. The author does not recognize an isolated disease of the lateral structure.

The extension of the inflammation from the labyrinth to the meninges occurred most frequently along the aqueduct of the cochlea, and more rarely along the sheath of the auditory nerve. In this regard the aqueduct of the vestibule is not of great importance.

SCHEIBE.

153. The author adds a fifth case to the four previously published cases of ossified aural polypi (Bezold, Hedinger, Cocks, Kupuska).

BRANDT.

C.—CEREBRAL COMPLICATIONS.

154. Trétrop. Latent abscess of the brain. *La presse oto-larynologique Belge*, 1904, No. 6.

155. Alt. Operations in the posterior cranial fossa. *Wiener klin. Wochenschrift*, No. 19, 1904.

156. Schulze. Diagnostic mistakes in aural surgery. *A. f. O.*, vol. lxi., p. 1.

157. Schulze. A rare form of otitic gravitation abscess. *A. f. O.*, vol. lxi., p. 256.

158. Sachs. On the diagnosis of sinus thrombosis. *A. f. O.*, vol. lxi., p. 176.

159. Voss. Advances in the surgical treatment of otitic septic pyæmia. *Berl. klin. Wochenschr.*, 1904, No. 28.

160. Grossmann. On tuberculous sinus phlebitis. *A. f. O.*, vol. lxi., p. 30.

154. This case shows again that a severe fatal affection of the brain may give as its only symptom severe headache, and that even this may at times be absent. Fever may occasionally be present, vertigo and vomiting may be absent. If other severe diseases are present, as in this case, the diagnosis of a cerebral

abscess is very difficult. A facial paralysis may aid in the diagnosis when it is possible to locate the injury as a compression of the nerve within the skull. BRANDT.

155. Report of two cases of cerebral abscess terminating in recovery, one after acute, the other after chronic purulent otitis. In both cases there was a fistula in the dura which led to the abscess. The abscess in the acute case was as large as a lentil and situated at the inner side of the sinus. In the chronic case, the abscess was as large as a bean and situated laterally from the sinus. The infiltrated dura was excised. In the acute case, the symptoms appeared three months after the beginning of the suppuration, with intense vertigo, headache, horizontal nystagmus, no change in the eye-grounds, no fever, no retardation of the pulse, no symptoms of defect.

In the chronic case, cholesteatoma was found in the canal. Double choked disk. Pulse 60, T. 38.3° – 39° . Fistulæ in the mastoid process. Recovery after four weeks.

The author also reports upon three cases of thrombo-phlebitis.

1. Acute suppuration, thrombo-phlebitis of the transverse sinus, of the right jugular vein, metastatic pulmonary abscess. The thrombosed jugular vein could be palpated to within 2 cm of the clavicle. The ligature was applied 1 cm above the sub-clavicular vein. The discolored brown clots were removed. Fourteen days after ligation of the jugular vein, a small pulmonary abscess was opened. The pus contained streptococcus pyogenes. The wound in the neck was healed after three weeks, the pulmonary wound after four and one-half weeks.

2. Chronic suppuration with cholesteatoma. Thrombus of the sigmoid sinus. External pachymeningitis. Pyæmic fever lasting eight days. The sinus was excised and the thrombus removed. Recovery after fourteen days.

3. Pyæmic fever lasting for ten days. The incised sinus evacuated discolored thrombi and several drops of pus. Recovery.

WANNER.

156. In the following two cases the mistaken diagnosis of an intracranial lesion led to unnecessary operative intervention.

1. A woman with chronic purulent otitis presented a number of symptoms suggestive of a severe intracranial lesion. Lumbar puncture (slight turbidity, increased number of leucocytes, no bacteria) did not speak absolutely for meningitis but led to a suspicion of the presence of circumscribed meningitis. In the

subsequent course, after a second lumbar puncture the diagnosis of meningitis became impossible. It now seemed to be a brain abscess, which was first located in the temporal lobe (aphasia paralysis), then in the cerebellum (intense vertigo, functional disturbance of the labyrinth). In both localities puncture was without result. The autopsy showed a normal brain, chronic nephritis, so that the symptoms were subsequently decided to be uræmic. The moderate amount of albumen with a not appreciably diminished quantity of urine was regarded as the result of a cerebral disease. Microscopical examination of the urine was not undertaken. This might have led to the correct diagnosis.

2. A boy with chronic purulent otitis gave a history of chills; an infiltration of the soft parts towards the occiput was present, so that an involvement of the sinus was supposed. In addition, quite a number of symptoms pointed to meningitis. This was excluded by an absolutely negative result on lumbar puncture. The paralysis of the opposite side with an alteration of speech was therefore referred to an abscess in the left temporal lobe, and an operation was performed without result. The autopsy revealed neither an abscess nor an extradural suppuration and not a trace of a thrombus was visible in the sinus or in the bulb. The internal wall of the sinus was everywhere apparently normal. To explain the symptoms, a disease of the sinus (discoloration of the external wall) as found at operation could only be accepted, and it must be assumed that the enormous toxicity of the septicopyæmic process (with irritative symptoms resembling meningitis and paralysis caused by focal disease) led in a short time to death though the disease of the sinus was still in its incipient stage.

HAENEL.

157. In a case of cholesteatoma, an abscess of the cerebellum had led to a thrombosis of the adjoining knee of the transverse sinus, with an extension of the thrombus along the superior and inferior petrosal sinuses to the bulb of the jugular vein. The sigmoid sinus was empty from pressure of the cholesteatoma. Thrombosis of the petrosal sinus had produced a deep-seated extradural abscess situated at the anterior margin of the foramen magnum, which had gravitated along the medulla oblongata to the second cervical vertebra and passing between the skull and the first cervical vertebra with the vertebral artery had perforated into the muscles underneath the deep cervical fascia. The occurrence of this extradural abscess was favored by an unusual development of

the petrosal sinus and by the broad communication of the inferior petrosal sinus with the basilar plexus. HAENEL.

158. SACHS has observed, just as Piffi, that the exposed sinus shows undulating movements of its wall during deglutition. He recommends for clinical and anatomical investigation :

1. Whether the deglutition phenomenon is so constant in the healthy sinus that in its absence the diagnosis of thrombosis may be made.

2. Whether it is present when there is a small obturating thrombus. HAENEL.

159. This is a report of the experience which has recently been made in the ear clinic of the Charité in operative treatment of thrombosis of the jugular bulb. In one case, where after incision and evacuation of the thrombus with ligature of the jugular vein no permanent fall in temperature resulted, the bulb was exposed according to the Grunert-Piffi method by removal of the anterior and lower canal wall, and the floor of the tympanum then incised and irrigated. Before the final recovery, several chills with meningeal symptoms occurred. On the other hand, the previously present diazo-reaction disappeared immediately after the second operation. In the second case, the bulb was exposed by a method devised by Voss, which consists in chiselling away the bone from the mastoid wound above the deepest part of the sinus, which has been previously exposed as far as possible and evacuated with a favorable result. According to Voss, this method is simpler than that devised by Grunert and Piffi. Further observations must show whether it is applicable in all cases. MUELLER.

160. In a child five and one-half years old, who had suffered from otorrhœa after scarlet fever for one year, the mastoid process was opened, the sinus operation was performed, and the patient subsequently died from tuberculous meningitis, which had been diagnosticated by lumbar puncture during life. At the autopsy the following interesting microscopic condition was found:

The wall of the sinus is healthy in its outer and middle layers except at the site of perforation. The intima are completely transformed to granulation tissue and infiltrated with thick foci of epithelioid cells. There are also giant cells with numbers of tubercle bacilli and beginning caseation. The thrombus presented, in addition to the characteristic signs of a regressive

metamorphosis (caseation), also traces of organization, with the formation of infiltrating tuberculous granulation tissue. Five cases of tuberculous disease of the sinus were found in literature. Of the six cases thus far published, tubercle bacilli were found present in five. In four there was a miliary tuberculosis, which in one case was complicated with meningitis. In one, in addition to the tubercle bacilli, staphylococci and bacillus pyocyaneus were found in the thrombus.

HAENEL.

d.—OTHER MIDDLE-EAR DISEASES.

161. Frey. On ankylosis of the malleo-incudal articulation. *A. f. O.*, vol. lxi., p. 234.

162. Stein. Osteomyelitis of the ossicles in chronic dry tympanic disease (lues hereditaria tarda). *A. f. O.*, vol. lxi., p. 169.

163. Weidler. The use of myelocene in catarrhal deafness. *Penn. Med. Jour.*, July, 1904.

164. Squires. A new sign of basilar meningitis. *N. Y. Med. Record*, March 26, 1904.

161. After describing twenty-five cases collected in literature, the author gives the result of two histological examinations. In the first case, both ossicles were connected by a bony bridge, which was situated perpendicularly to the plane of the joint and was directly connected with the bony substance of both ossicles. About the bony bridge the cartilage showed calcification. The ossicles were otherwise bound together by connective tissue.

In Case 2 the bony substance of the ossicles was very much reduced by a decided dilatation of the osseous canals. The hyaline cartilage was very much thickened. An articular fissure was not present. In the periphery the periosteum of the arteries was enormously thickened. In both cases the ankylosis was the result of a chronic inflammatory process in chronic purulent otitis. According to the author, it is very doubtful whether catarrhal changes in the tympanum can ever lead to an ankylosis of the malleo-incudal articulation. He describes four forms of ankylosis:

1. Peri-articular connective-tissue ankylosis.
2. Peri-articular bony ankylosis.
3. Intra-articular bony ankylosis.
4. Intermediate forms with intra- and peri-articular changes.

HAENEL.

162. An interesting microscopic condition in the ossicles, which appeared macroscopically healthy and were removed in a

woman, twenty-five years of age, suffering from chronic catarrhal otitis and distressing otitis. The periosteum was found thickened three or four times, and converted into a tough homogeneous membrane where the mucous covering had also become lost. In the medullary spaces of the neck and handle of the hammer there were hyperæmia, infiltration of the medulla with lymphoid and polynuclear cells; osseous resorption, osteoclasts, islands of necrotic bone. The anvil presented similar changes. According to the author, the process is a chronic osteomyelitis of hæmatogenous origin produced by hereditary lues. HAENEL.

163. From ten to thirty drops were instilled into the external auditory canal and left in for from five to ten minutes, during which time the tympanic membrane is slowly massaged with a cotton carrier, thirty strokes to the minute, and then the excess of oil is removed, leaving the membrane and canal hyperæmic. Five cases treated. Three showed decided improvement.

BRYANT.

164. This sign, which is invariably present, is a rhythmical dilatation and contraction of the pupil, appearing as early as the fourth or fifth day. Method:

Place the child's head between the knees of the physician, face upward, with the body of the child supported on the bed, table, or lap of the nurse. Grasp the sides of the child's head with each hand and produce gradual and forcible extension of the head on the spinal column. As the head is brought back in this extension the pupils will be seen to commence to dilate simultaneously with the commencement of extension: the more extreme the extension the more the dilatation. Now on flexion the pupils contract so that when the chin is forcibly brought to the manubrium the pupils are well closed up. This can be done several times a minute, and each time the pupillary phenomenon will be repeated.

BRYANT.

NERVOUS APPARATUS.

165. **Oliver.** Right pulsating exophthalmos; ligation of both the right common carotid artery and the left internal carotid artery; accidental traumatism; cure. *N. Y. Med. Jour.*, April 7, 1904.

166. **Bryant.** Tinnitus aurium; etiology. *Ann. of Otol.*, March, 1904.

167. **Weil.** Case of objective tinnitus. *The Laryngoscope*, March, 1904.

168. **Baker.** Deaf-mutes. Report on examination of pupils of the Cleveland School for the Deaf. *Cleveland Med. Jour.*, April, 1904.

169. Carbone. Ophthalmoscopic condition in a case of Ménière's disease. *Arch. ital. di otol.*, etc., xv., No. 4.

170. Panse. Clinical and pathological contributions. IV. A glioma of the auditory nerve (with four drawings). *A. f. O.*, vol. lxi., p. 251.

165. Fifteen-year-old boy, shot back of right ear, has a thumping noise back of right ear and perceptible thrill. Bruit can be heard over right eye. The ligation of the vessels made no particular permanent difference in the symptoms. Three years after the accident the boy collided with a playmate. The tinnitus began to decrease that same day together with the exophthalmos, and the bruit disappeared on the following morning.

BRYANT.

166. Tinnitus is due to sound vibrations arising outside the ear or originates within the ear; also due to nerve stimuli of uncertain origin, some of them probably very faint sound vibrations. These faint sound vibrations can arise from the normal vital sounds of the body, and movement within the ear or from sound vibrations started by the conduction of other sounds through an impaired conduction apparatus. The stimuli may be reflex or of purely nervous origin, peripheral or central.

BRYANT.

167. A loud systolic murmur synchronous with the heart-beat, varying in intensity, can be heard by auscultation. The hearing is impaired in both ears. Heart, lungs, and chest normal. No aneurism, anæmia, or venous hum in the neck.

Ears, nose, and pharynx, as well as the fundi oculorum, normal. Cause indeterminate.

BRYANT.

168. Emphasizes the necessity of teaching these children to understand the motion of the lips and associate with hearing children in school and at home, in order to counteract their tendency to retire from the world and associate by themselves. The basis of this education is substituting the lip for the sign language. This will make them happier individually and better citizens.

BRYANT.

169. During the various attacks of Ménière's disease from which this patient, thirty years of age, suffered, the author was able to make an ophthalmoscopic examination which always showed distinct congestion of the papillary blood-vessels. He therefore concludes that in this case Ménière's attacks were produced by a hyperæmia of the labyrinth, whose blood-vessels were

in intimate relations to those of the eye through the cavernous sinus.

RIMINI.

170. This tumor was situated in the internal meatus. Histologically it was a fibroglioma. The meatus was dilated; the facial nerve was preserved, but the auditory nerve was disintegrated by the tumor, with the exception of a few fibres. There was an atrophy of the spiral ganglion as well as the nerves of the superior portions of the labyrinth. The hair cells of the ampulla were indistinct. Corti's organ showed signs of decomposition. In order to remove such a tumor by operation the internal ear would have to be first resected; the facial nerve could be preserved by laying it bare between the stylo-mastoid foramen to the geniculate ganglion.

HAENEL.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

171. **Ingersoll.** A study of the development of the nose and its accessory cavities. *Ann. of Otol.*, June, 1904.
172. **Fischer.** Exanthematous eruptions following throat operations. *The Laryngoscope*, May, 1904.
173. **Lockard.** Platinum rhinitis. *Ann. of Otol., Rhin., and Laryng.*, Dec., 1903.
174. **Fridenberg.** Necessity for supplementary measures after the removal of adenoids. *Arch. of Pediatrics*, April, 1904.
175. **Toerne.** A study of the bacterial relations of the accessory nasal cavities and their protective influence against bacteria. *Nordisk medicinsk Arkiv*, 1904, vol. i., No. 1.
176. **Schmiegelow.** On the relation between diseases of the nose and of the eye. *Archiv für Laryngol.*, vol. xv., No. 23.
177. **Halász.** On nasal infection of the ocular conjunctiva. *Archiv f. Laryngol.*, vol. xv., No. 18.
178. **Carbone.** A study of ocular affections of nasal organs. *Arch. ital. di otol.*, etc., vol. xv., No. 4.
179. **Onodi and Zirkelbach.** On the pathology of anosmia. *Archiv f. Laryngol.*, vol. xv., No. 9.
180. **Lamann.** Additional remarks on my theory of the upper protective system. *M. f. O.*, 1904, No. 6.
181. **Schmiegelow.** A rhinological peculiarity. *Archiv f. Laryngol.*, vol. xv., No. 35.

171. Causes the author to conclude that in man the accessory cavities of the nose are rudimentary structures, because in animals with acute sense of smell the accessory sinuses all contain

olfactory turbinals, whereas in animals not having acute sense of smell the sinuses contain little or no turbinal tissue and their functional activity is lost.

BRYANT.

172. The rash appears on the second or third day after the operation and may be roseolar, erythematous, or papular in type. It generally appears on the neck, chest, and abdomen, but sometimes extends to the face and extremities. It lasts usually two or three days, but even longer. Most cases terminate in desquamation, in some with severe itching before it, with little constitutional disturbance, moderate rise of temperature, except in a few cases. FISCHER concludes that the exanthematous eruption has nothing to do with the operation itself, that the infection evidently took place before the operation, and that the period of incubation might have been shortened through the traumatism.

M. TOEPLITZ.

173. In a photographer, æt. thirty-six, attacks of so-called "hay fever" with hydrorrhœa, sneezing, and lachrymation developed from the work with the popular platinum prints. In the beginning the symptoms appeared only after a sojourn of 30 to 90 minutes in the dark room, and subsided in the open air, but later they occurred within a few minutes and never completely subsided. Temporary improvement took place after cauterization, cocaine, and adrenalin, permanent relief after the abandonment of the paper. Four other cases were also observed; in one, not only the use of the dry paper, but also the use of the platinum toning solution, composed of phosphoric acid and platinum chloride, for the aristo paper, precipitated the paroxysms.

M. TOEPLITZ.

174. Supplementary measures are necessary because the habit of mouth-breathing must be corrected and the habit of nasal breathing must be established, which require careful training of the child. The supplementary correction of nasal defects and irregular dentition are indicated in order that nasal breathing will not require a special effort of the will. Chewing gum is advocated to assist in forming the habit of keeping the mouth closed.

BRYANT.

175. The author has examined 8 freshly slaughtered calves, of which 6 possessed absolutely healthy accessory cavities. In not one of these cases could bacteria be found. He also examined 52 fresh cadavers, of which 16 showed pathological

changes in the accessory cavities. They were examined as soon as possible after death. The antrum of Highmore was opened through the anterior wall, the frontal sinus through the conjunctival sac, so that the face was not deformed. The discharge was investigated on various culture media. In 29 of the 36 cadavers, the maxillary antra and frontal sinuses were sterile. In 7, bacteria were found in one or more. In 22 cases, which were examined not later than 2 hours and 20 minutes after death, bacteria were found. In the other 14 cases, no relation to the elapsed time was evident.

We may therefore assume that in the living the frontal sinus and maxillary antra are normally free from bacteria, and that the invasion of bacteria occurs several days after death. These investigations have shown that the post-mortal invasion takes more quickly into the maxillary antrum than into the frontal sinus, and that the bacteria encountered were usually those found in the nose. In two cases the cavities contained mucus which had probably found its way after death. In the other 14, diseased conditions were present in 28 accessory cavities; 11 of these were affected only with a catarrhal inflammation, in 9 without bacteria; in 2, bacterium sputigenes and micrococcus were present. In 14 cavities containing purulent mucus and chronically inflamed mucous membrane, bacteria were found in 11, and of 8 different varieties. It is remarkable that in 3 cases the bacillus mellodorifer and in 2 the bacillus vulgaris were found, whose growth is arrested at 34° C. It seems, therefore, likely that the temperature in the accessory cavities does not rise above 34°. In 3 cavities an acute purulent sinusitis was found present in a cadaver where croupous pneumonia had existed. In cases of pulmonary tuberculosis 23 per cent. showed changes of the accessory cavities, 31 per cent. where other affections of the respiratory tracts were present, and 14 per cent. without any changes.

Of the various bacteria found there seem to have been 3 new species: micrococcus pseudo-catarrhalis, micrococcus tardeli-quans, and bacillus mellodorifer.

Finally, the author has collected the various bacteria found in the accessory cavities in two tables.

Details about the technique, which was very carefully followed out in order to avoid accidental infection, must be read in the original.

JOERGEN MOELLER.

176. 63 patients with accessory-sinus diseases showed complicating eye diseases in 17: epiphora, blepharo-conjunctivitis, ciliary neuralgia, severe orbital pain, convergent strabismus, dislocation of the eyeball, peribulbar abscess, with paralysis of the orbital muscles and amaurosis. The various ocular diseases are described, especially in regard to their rhinogenic origin, with the aid of cases quoted in literature and personal observations, such as rhinogenic neuralgia in and about the eye, supra-orbital neuralgia, cystic swelling of the anterior ethmoidal cells with dislocation of the eyeball, endothelioma in the right superior maxilla with paralysis of the external rectus. The details must be read in the original.

ALBANUS.

177. A case is reported where pus reached the conjunctiva from an inflammation of the maxillary sinus which had perforated into the lachrymal duct and had caused a conjunctivitis with corneal ulcers. As the suppuration in the sinus improved, the ocular affection disappeared. Opposed to the results of other experimenters, the author believes that the conjunctiva finally loses its power of resistance against purulent invasion.

ALBANUS.

178. In this paper the ocular affections are described which are often associated with nasal disease.

RIMINI.

179. The published cases of anosmia are grouped according to Onodi as follows :

1. Essential or true anosmia.
2. Mechanical or respiratory anosmia.
3. Functional anosmia.

Results are given of numerous investigations from clinical patients usually with nerve diseases with the aid of Onodi's apparatus (qualitative examination) and with Zwaardemaker's instrument (quantitative examination). The authors are going to continue their clinical investigations and undertake some pathological examinations of which very few have at the present time been made.

ALBANUS.

180. This is an extension of the theory previously published on the erectile bodies of the anterior and posterior ends of the lower turbinals, on the soft palate, the epiglottis, and on the lateral ventricular folds of the larynx.

PIFFL.

181. A man thirty-five years of age was able to bite his own nose by protruding his lower jaw so that he could grasp the tip of his nose between the upper and lower teeth.

ALBANUS.

b.—SEPTUM.

182. Mueller. On the technique of Krieg's window resection. *Archiv f. Laryngol.*, vol. xv., No. 26.
183. Zarniko. On the window resection in septal deviations. *Archiv f. Laryngol.*, vol. xv., No. 19.
184. Menzel. On window resection of the deviated nasal septum. *Archiv f. Laryngol.*, vol. xv., No. 3.
185. Hajek. On Krieg's window resection. *Archiv f. Laryngol.*, vol. xv., No. 2.
186. Spratt. The removal of septal spurs and the correction of deviations of the septum by more rational methods. *Amer. Med.*, May 7, 1904.
187. Coolidge. Deviation of the nasal septum. *Boston Med. and Surg. Journ.*, May 5, 1904.
188. White. Resection of nasal septum. *Boston Med. and Surg. Journ.*, April 21, 1904.
189. Quinby. A factor in the etiology of distorted nasal septa. *Med. News*, March 12, 1904.
190. Shubbs. A modification of the Krieg operation for deviated septum. *Annals of Otology, Rhin., and Laryng.*, Dec., 1903.
191. Freudenthal. The septum narium in aborigines and the cause of deviations of the septum in general. *The Laryngoscope*, March, 1904.

182. The author has performed 165 window resections during ten years and is convinced of their universal utility. Since the introduction of adrenalin no after-hemorrhages had occurred. The author does not introduce any packing. It is especially necessary to make the incision of the mucous membrane and periosteum sufficiently large. Preservation of the mucous membrane on the convex side is of no advantage. Post-operative deviations may result when not enough has been removed at the operation. The operation is often followed by an improvement of the external form of the nose. The bridge of the nose may sink in if the adjacent part of the cartilage or the interior lower margins of the septum are injured. ALBANUS.

183. The author states that Killian, as early as the 71st meeting of the German Naturalists and Physicians in Munich, recommended preservation of the mucous membrane on the convex side in the window resection. In the author's experience a large flap of mucous membrane does not need to be sutured. Packing is also unnecessary. A case of post-operative deviation of the septum was observed due to the suction of the left nasal ala to the septum. The negative air pressure forced the movable septum into the left half of the nose.

Recovery after the use of a rubber tube and Schmidthuisen's ring. A similar experience in a second case. In this Feldbausch's prosthesis was employed. ALBANUS.

184. MENZEL. In order to abbreviate the period of healing, and to prevent the usual disturbances of secretion, the author has preserved the mucous membrane on both sides of the septum in the operation of deviated septum practised in Hajek's Dispensary. Instead of three incisions, one incision is made on the inferior edge of the septal cartilage made prominent by the finger. In most of the fifteen cases reported the anterior margins of the septal membrane were sutured with two or three threads and packed on both sides. Recovery usually took place by primary union after six to ten days, rarely fourteen days. In order to avoid a deformity of the nose, the supporting septal cartilage directly underneath the bridge of the nose should be preserved to a distance of $1-2\frac{1}{2}$ cm. ALBANUS.

185. A report of 100 cases operated on according to Krieg's method; 35 were re-examined after 1-2 years. The results were good even in the difficult cases. The former inconvenience of a large raw surface on the convex side was removed by preserving the mucous membrane, though the operation is thereby made more difficult. The new septum often shows partial deviations. In an S-formed septum, a right-sided deviation may be converted into a left-sided one by operation if too much of the bony frame is removed. ALBANUS.

186. SPRATT advocates the "flap operation," as he calls the Krieg operation, for the removal of spurs and deviations. He dissects a large triangular flap of mucous membrane, removes the cartilage in layers by means of a chisel 16 cm long, with a cutting edge 6 mm to 8 mm wide, and a shank, directly back of the blade, 1 mm by 3 mm. In removing spurs with broad bases or at the junction of the septum with the nasal floor, he uses a small gouge. If the spur advances to the bony portion, the chisel cuts through with light taps of a mallet. If in addition to the spur there is considerable deviation, the mucous membrane of the opposite side is separated and the whole thickness of the cartilage or bone is removed. M. TOEPLITZ.

187. COOLIDGE removes, where there is a perpendicular cartilaginous angle on the obstructed side, a piece of cartilage from its whole length without injuring the mucous membrane on the

concave side. He uses a steel cylinder sharpened at one end, then introduces a saw along the floor of the obstructed cavity and cartilage separating it from the vomer and the maxillary spine by cutting obliquely upward through the septum. The free lower edge of the cartilage can then be forced over the free upper edge of the vomer into the concavity of the opposite side, where it overlays and maintains itself in position.

M. TOEPLITZ.

188. A vertical incision, just anterior to the deflection, is made with special knives, one with the blade placed parallel to the handle, while the other is at right angles. The blades are guarded, cutting only 1.5mm deep. The mucous membrane with its perichondrium is dissected by an instrument with large handles and blades at an angle of 135°, which are respectively 5 and 9mm wide, thin, and have rounded edges. The guarded knife incises the cartilage, the smaller dissector is inserted, the concave mucous membrane is pushed away, and the denuded cartilage removed by cutting forceps, aided by rongeur, alligator forceps, chisel for bone ledge, and ring knives for small fragments. The flap is then stitched back.

M. TOEPLITZ.

189. A young girl developed during her eleventh year a tendency to mouth-breathing. There was a decided deflection of the cartilaginous septum. The left plate of the vomer was bent outward at its posterior end and was not in articulation with the palate bones in the central line. The second dentition was well advanced. The inherited triangular teeth had come in irregularly. The two lateral incisors had their inner edges rotated backward and the whole tooth carried inward, until it was overlapped by the central incisor fully one-half its width. The alveolar arch was broadened by separating the maxillary bones. A band was placed about the second bicuspid and first molar of each side. Pressure was made by means of a small jack-screw upon the two bands, light at first, but slowly increased. In two weeks the central incisors had been separated a little over an eighth of an inch. Soon after the breathing became more free through a marked decrease in the flexion of the cartilage. The bending of the septum was due to imperfect articulation and undue vertical pressure from the developing maxillary bones.

M. TOEPLITZ.

190. SHUBBS makes a vertical incision along the entire anterior edge of the triangular cartilage or side of convexity, separates

the muco-perichondrium with a small—curved on the flat—elevator over the convexity and concavity, then cuts out the cartilage and, if necessary, the bone with an alligator or fenestrated cutting forceps and stitches the linear incision. In removing spurs, Shubbs also preserves the mucous membrane by separating it beforehand.

M. TOEPLITZ.

191. FREUDENTHAL has examined 1164 crania at the American Museum of Natural History in New York, coming from aborigines from all over the American continent (British Columbia, Mexico, Arizona, Colorado, Montana, Peru, and Bolivia); 350 were excluded; of the remaining 814, more than one-third, 264, had all varieties and shapes of disfigured septa, most numerous in the anterior part of the bony septum, next in the middle part, very rarely in the posterior. The cartilaginous portion was preserved in very few instances. S-shaped deviations were frequent. Exostoses and fractures were also noticed.

M. TOEPLITZ.

C.—OZÆNA.

192. Doeбели. On the formation of the discharge in ozæna. *Archiv f. Laryngol.*, vol. xv., No. 10.

193. Tarnowski. Ozæna healed by Behring's anti-diphtheritic serum. *Deutsch. med. Wochenschr.*, No. 23, 1904.

192. The various views on the etiology of ozæna are discussed. In noses which had been cleaned, in seven cases the formation of crusts was examined from hour to hour with a microscope. In all cases leucocytes formed the greater part of the discharge, including a few "mast-cells." Squamous epithelium at first rare, later more numerous. The author is undecided why the nasal mucosa allows a more rapid migration of leucocytes, and is inclined to agree with Cholewa and Cordes as regards the etiology, viz., a primary rarefying ostitis of the nasal turbinals—in other words, an inflammation directly underneath the atrophic mucous membrane. Macroscopically a thin layer of mucoid was first observed, then increasing white patches, finally white membranes were formed. One case was examined bacteriologically and showed the presence of the staphylococcus aureus and the bacterium Friedlander in pure culture.

ALBANUS.

193. After having read Dr. Neufeld's article on chronic diphtheria, the author reports upon three cases of ozæna which he

believes to have been cured by injecting diphtheritic anti-toxine. In the first case the first injection was successful, in the second it required two. In the third case, which had existed for forty years, numerous injections only produced a partial cure. Though the formation of crusts had ceased, the sense of smell did not return.

NOLTENIUS.

d.—TUMORS.

194. **Cozzolino.** Melanosarcoma of the nasal mucous membrane, with investigations on the origin of melanotic pigment. *Archiv f. Laryngol.*, vol. xv., No. 6.

195. **Johnston.** Sarcomata of the nasal septum. *The Laryngoscope*, June, 1904.

196. **Watson.** Sarcoma of the nasal passages. An inductive study, based on the records of 150 cases. *American Medicine*, April 2, 1904.

197. **Ingermann.** Primary epithelium of the nasal fossæ, with report of a case. *Annals of Otol., Rhin., and Laryng.*, Dec., 1903.

198. **Toeplitz.** Nasal syphilitic tumors. *American Journ. Med. Science*, May, 1904.

194. A priest fifty-eight years of age suffered from occlusion of the right half of the nose, a dark purulent discharge, occasional neuralgia about the forehead and orbit. On examination the right half of the nose contained a dark tumor which was also visible post-rhinoscopically. The tumor appeared like a so-called melanotic polypus, but microscopic examination showed it to be a melanosarcoma. The tumor was radically removed; the base was destroyed with a thermo-cautery. Relapse after one month. Extension of the tumor. Resection of the maxillary without avail. Death from sarcomatous cachexia. Histological description with illustrations should be read in the original. As regards the origin of the pigment, the author is inclined to regard it as of hæmatogenous origin. The iron reaction was positive.

ALBANUS.

195. There are now about sixty cases of sarcoma of the nasal septum among 178 cases of intranasal sarcomata on record. JOHNSTON reports a well-observed case in a woman, aged seventy years, with complete nasal obstruction. She had first noted a small swelling above the left clavicle, then counted nine such swellings in front of the left ear. Later on, all anterior and lateral cervical glands were enlarged. In the left nostril the normal opening was completely blocked up by a large mass, which was attached to the septum from roof to floor. A removed specimen

was made up almost entirely of round and spindle cells. Upon partial removal the growth rapidly recurred. The nose became swollen on both sides, the swelling on the left extending under the eye, involving the lid and the lachrymal apparatus. The face assumed the "frog-face type." The axillary glands grew to the size of pigeon eggs. Death. Autopsy: The lower pulmonary lobes contained an excessive amount of fluid, the apices scars of healed tuberculosis. The tumor extended on the left side over the superior maxillary bone. The growth began in the cartilage or the mucous membrane of the septum of the left side. Sarcomatous degeneration of the glands was found, but no metastases in internal organs. Seventy-one cases are tabulated, briefly analyzed, and a complete bibliography up to 1899 is appended.

M. TOEPLITZ.

196. WATSON gives the histories of four cases, which he includes in the 150, upon the report of which the paper is based. CASE I was seen in a boy of ten, whose left nostril was occluded by a pedunculated mass attached to the anterior portion of the inferior turbinate. It was a typical small-celled sarcoma with large vascular spaces. No recurrence took place in two years after removal. CASE II. was in a girl of ten with stenosis of the left nasal passage and external deformity, widened bridge, and prominence of antral region. The firm growth extended to the posterior naris and was attached to the outer wall; the septum was pushed to the right. The growth was removed from the left naris and maxillary antrum through the almost completely destroyed nasal wall. Fibrosarcoma. No recurrence in one and one-half years. CASE III., a woman, æt. forty-three, had recently two attacks of erysipelas with obstruction of left nasal fossa, noticeable protuberance of the left side of the face and nose, slight exophthalmus, and displacement outward of the left eye. The fibrosarcoma was removed intranasally. The retardation of the growth was possibly due to the erysipelas or pregnancy and lactation. In CASE IV. a boy of ten, a growth of the size of a walnut, obstructing the left nostril and attached by pedicle to the quadrilateral cartilage, a round-celled sarcoma, was removed by the cold snare. No return in several months. Watson analyzes the 150 cases on record, discussing the different varieties, their microscopic and gross appearances, whether pedunculated or sessile, their point of origin and extent, consistence, causes, occurrence, more in youthful life, prevalence in

the female. He denies the transformation from the benign into the malignant growth. Metastases are rare. The percentage of recoveries is 54.68 by intranasal operations, 39.58 by radical external operation; he favors the first method. Improvement takes place in three out of four cases after ligation of the external carotid. A bibliography is appended.

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197. The total of all reported cases of primary nasal carcinoma is between sixty and seventy; only one of change from a benign into a malignant form has been proven. The original seat of the carcinoma in the nasal fossæ differs according to the authors. INGERMANN relates a case of a man, fifty-eight years old, who was affected in the nose after the scarlet fever. He noticed in the left nasal fossa a pimple, had acute pain, dropping of sanguinolent secretion, but free nasal breathing. On the lower part of the septum, not far above the junction of the skin and mucous membrane, a tumor $\frac{1}{2}$ cm high, 1 cm wide, and 2 cm long was located. It was of dark red color with an ulcerated surface. Microscopically it was an epithelioma with numerous cell nests, multiple mitoses, squamous epithelia of different shapes, and onion-like forms of concentrically arranged cells. The tumor was removed with scissors and snare, curetted in its entire base, and part of the surrounding healthy tissue and the operated surface cauterized with chromic acid. No recurrence took place in six months.

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198. TOEPLITZ observed a case of a syphiloma in a woman, aged twenty-six years, who suffered from obstruction of the left nostril, formation of thick crusts, loss of sense of smell, and severe epistaxis. The left nostril was obstructed by a large movable tumor, which was removed piecemeal with the cold snare under extreme hemorrhage. It sprang from the upper boundary of a large perforation of the septum, through which the tumor disappeared into the right nostril. The histological examination expressed a suspicion of sarcoma. The urine contained bacilli resembling tubercle bacilli; the sputum was negative. Anti-syphilitic treatment cured the nasal lesion, but was continued for an annular stricture of the rectum, along which a syphilitic neoplasm still remained.

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(To be concluded.)

ARCHIVES OF OTOLOGY.

NATURE AND AIM OF OBJECTIVE MEASUREMENT OF HEARING, AND ON THE USE OF THE OBJECTIVE AUDIOMETER.

BY PROF. OSTMANN, MARBURG-ON-THE-LAHN.

Translated and Abridged by Dr. J. A. SPALDING, Portland, Me.

OSTMANN'S method of testing the vibratory amplitudes of tuning-forks is to fasten them into a vise which is imbedded in a stone wall. The microscope with which the vibrations are measured is placed on an iron plate, likewise imbedded in the wall. Dry flour is strewn on the end of one of the prongs, and one of the granules nearest the edge is observed with the microscope, the excursions being measured with the micrometer eye-piece. A sort of gag, in which the initial force is always the same, sets the forks in motion. Three persons are needed for the tests: one to watch the vibrations, a second to call off the time, and a third to note the micrometer values when called off.

After a critique by Dr. H. Knapp,¹ the author wrote as follows:

"The friendly reception and criticism given to my brochure, *An Objective Audiometer and its Use* (J. F. Bergmann, 1903), give me the chance to describe more fully the nature and aim of the objective measurement of hearing, as well as those of an objective audiometer which I have experimentally discovered.

"It is of the greatest importance in otology to be able to measure the extent and form of any disturbance of hearing objectively, because analysis of hearing is one of the

¹ These ARCHIVES, vol. xxii., p. 412.

most suggestive, and occasionally the only support for differential diagnosis between diseases of the sound-conducting and sound-perceiving apparatus."

Next to v. Conta,¹ Politzer² and Lucae³ deserve the credit of having first recognized the differential and diagnostic importance of examinations of the ear with simple pure tones. The methodical use of forks of varying pitch developed at once the extreme diagnostic value of such investigations. For, as Lucae said: "The important discovery was made that a series of affections which, from the objective conditions and the usual terminology, would have been registered as chronic middle-ear or tympanic catarrh were proved to be well defined diseases of the inner ear."

Having then no audiometer objectively correct, all measurements of the hearing were made after v. Conta's principle. They compared the time during which a dying-out fork was perceived by the patient and by the normal ear, and expressed the acuteness of hearing by a fraction; the numerator marking the seconds during which the sound was perceived by the deaf ear, and the denominator those for which it was perceived by the normal ear.

To this method Hartmann⁴ added his graphic representation of hearing tests, against which Jacobson at once protested⁵ and as I think justifiably. As, however, we knew of no better substitute, we had to satisfy ourselves in obtaining, even if by a false analysis, pictures which could to a certain extent be compared with one another.

It became more evident in the course of time, that an objective measurement of hearing, with unclamped tuning-forks, could only be established on the normal dying-out curves, and when Bezold and Edelmann had at last produced their continuous tone-series, the necessary material was ready and more earnest efforts began.

¹ "A New Audiometer," *A. f. O.*, vol. i., p. 107, 1864.

² *Wien. klin. Wochenschr.*, Nos. 42 to 44, 1868, and *Wien. med. Presse*, Nos. 12 and 13, 1869.

³ *A. f. O.*, Bd. No. 120, 1879, vol. xv., p. 277, 1880, and vol. xix., p. 73, 1883.

⁴ *Deutsch. med. Wochenschr.*, No. 15, 1885.

⁵ *A. f. O.*, vol. xxiv., 1887.

The first experiments to determine such values were made by Edelmann¹ but did not meet with the desired success. The determination of the acuteness of the hearing, based on these experiments, as was proposed by Bezold,² is erroneous, as has been proved by Schmiegelow and Forchhammer, Wien at the telephone, Zwaardemaker, Jacobson and Cowl, and myself. Panse also made unsuccessful experiments in this direction.

Therefore, up to the appearance of my paper, no one had determined the curves of Edelmann's unclamped C and G forks from the greatest amplitudes to the normal threshold-value, so that the amplitudes could be directly measured at intervals of seconds, or could be accurately calculated from the separately measured values. The reason for this lay in the extreme difficulty of measuring the minute vibrations with the necessary accuracy.

Gradenigo described at the Sixth Otological Congress in London³ an optical method of measuring the hearing, which can only be used to a limited degree. For, as he says: "The best results were obtained with forks of 60 V a second, although it can be used for those of 250 V." But as Politzer replied⁴: "In the case of forks over 60 V per second, which are heard longer than the vibrations of the triangle are visible, we are obliged to use the watch to determine the duration of the perception, assuming as the zero point the point at which the optical double images disappear."⁵

Forks of the second, third, and fourth octave are as necessary for measuring the hearing as the deeper forks; yet with such forks Gradenigo's method leaves us in the lurch. The amplitudes of higher forks soon become so minute that direct reading is almost impossible, although under special precautions, and when utilizing the higher magnifying powers, this may be done.

¹ *Trans. German Otological Cong.*, 1897.

² *Z. f. O.*, Band 33, 1898, p. 174.

³ *Transactions*, p. 17.

⁴ *Lehrbuch*, 1901.—ED.

⁵ The triangle is painted on one arm of a fork, and when the fork vibrates the figure looks blurred. See these ARCHIVES, vol. xxvii., p. 410.—TRANSLATOR.

Struyken¹ developed Gradenigo's method by first microphotographically producing the triangle so that amplitudes of from 200μ to 2μ could be observed, and finally perfected this plan till he could read amplitudes up to $1m$ from the forks without a microscope.

Zwaardemaker and Quix also used this method, and we can now say that, by their latest modifications and mine, with proper magnifying powers, we have measured, down to the lowest limits, the amplitudes of forks. Even then, however, we are hindered by imperfection of our apparatus, so that we have not yet obtained a sufficiently broad foundation for a perfect objective audiometer. Personally I have measured an amplitude of $0.0009mm$. Beyond this it was impossible to go. Therefore, with a c' fork, measurement of the amplitudes ceases one minute earlier than the vibrations of the fork become inaudible to the human ear.

We therefore see that the problem offered was not to be solved by direct measurements of the amplitudes alone, and, considering the infinite minuteness of the amplitudes of the higher forks, it could not be solved at all. It could only be perfectly solved by discovering the laws by which the normal amplitudes diminish in extent from octave to octave, as well as by determining the fact that the normal dying-out curves represent exponential curves; then the curves could be determined mathematically. The details of these laws can be seen in my brochure on "Vibrating Numbers and Threshold Values."²

Let me now explain the aim of objective measurements. This should determine both the amount and the form of the disturbance of hearing. The best means to find the amount, so far as the perception of speech is concerned, is by the whispered voice, but this cannot give us any idea of the form of the defect, as I have shown long ago.³ Furthermore, it can only be utilized within

¹ *Arch. Internat. de Laryng.*, Jan. et Fev., 1902.

² Engelmann's *Arch f. Physiologie*, 1903.

³ *Naturforsch. Versam. Cassel*, 1903, and *Wien. med. Woch.*, Nos. 19 and 20, 1903.

extremely narrow limits in diagnosticating the seat of the disease.

It is evident that the objective measurement of hearing with various high tones in no way diminishes the practical importance of testing the hearing with the voice, or makes any pretence to take its place.

The chief aim then of an objective determination of hearing is a more accurate diagnosis. This aim is also very practical, and has been energetically pursued for years by v. Conta, Politzer, and Lucae, to mention no others.

Another purpose of objective measurements with simple high forks is to obtain a more solid auditory and physiological foundation for tests with the voice, and, by comparison of the objectively-correct functional tests with pathological findings, to develop the physiology and pathology of the ear. Even the incorrect method of measuring with forks of various pitch has brought out many points of practical value in a differential-diagnostic point of view. Ought we not then to expect still greater success from correct measurements?

Gradenigo's method has not furnished the foundation for objective measurements; it is still an experiment, and, in the limits suggested above, a successful experiment to measure the vibrations of the lower forks. From this experiment, however, to the completion of tables for testing the hearing between the limits of the C and c⁴ forks is a long step.

My method is exact and reliable if the precautions are observed. With it I succeeded, with unclamped C and G Edelmann forks from the great to the fourth octave, in determining the dying-out curve to the cessation of sound for the normal ear, *i. e.*, to the normal threshold-value, so that for the entire duration the amplitudes, so far as they were not measured with the microscope, could be calculated in intervals of seconds. This was accomplished by interpolation of the values lying between the measured altitudes, and by extrapolation of those parts of the curves of the higher forks whose amplitudes, owing to their minuteness of excursion, could not be measured at all.

By mathematical calculations, we now found these normal amplitudes to be

for C

Of the great octave.....	0.0711
“ “ small octave.....	0.00474
“ “ first scored octave.....	0.000316
“ “ second scored octave.....	0.0000211
“ “ third scored octave.....	0.00000141
“ “ fourth scored octave.....	0.00000094

for G

Of the great octave.....	0.0118
“ “ small octave.....	0.00079
“ “ first scored octave	0.000053
“ “ second scored octave.....	0.00000353
“ “ third scored octave.....	0.0000002353
“ “ fourth scored octave	0.0000000157

As previously mentioned, the normal amplitudes of the highest forks can be calculated from those of the lower forks and from the number of vibrations.

Having once determined the normal curves of the unclamped C and G forks from a moment of extreme vibration to their dying out for the normal ear, tables could easily be constructed so as to be of practical use. These show the duration of vibrations in intervals of seconds, the time of dying out, the extent of the amplitude, the amount by which the amplitude diminishes, second by second, and so far as the extent of the amplitudes equals the number of normal amplitudes contained in each preceding larger amplitude of the dying-out curves. With these at hand, an objective test is easily, rapidly, and exactly carried out, presupposing that the forks have the same curves as those used in our tests, viz., the latest Edelmann model.

Every one who has followed improvements in the manufacture of these forks in shape and material knows the great advances made in the prolongation of the normal duration of perception. The longer (with similar excitation) a fork vibrates—*i. e.*, the less it loses from second to second, the

more useful it is for objective measurements, and so much the less will be the errors due to self-deception, inattention, and other causes.

The duration of perception of the latest of Edelmann's forks is so great that it should satisfy every practical necessity for an objective measurement. The next imperative need will be to furnish a series of such forks as will agree with those on which my experiments have been based. Edelmann has promised to gauge such a series, from those which he previously furnished to me, to use for a standard series. Having once obtained practical and satisfactory conformity in the dying-out curves, the results of measurements made by all observers can be compared with one another, and we shall have reached a basis for the solution of so important a question as the analysis of disturbances of hearing.

Objective measurements by my tables take all the less time the slighter the deafness, and may be made when the aurist has normal hearing or when he is deaf.

1. When he has good hearing, the fork should be struck so that the deaf person can still hear the sound. Then the threshold value of the affected ear is determined in the usual manner, and the measure is taken, from the moment it is passed, of the time which elapses until the fork ceases for the normal ear. This is the *difference-time*. We then find the position of the threshold value of the deaf ear within the dying-out curves of the forks, to find out from the tables the extent of that amplitude at which the tone died out for the deaf ear.

In doing this we start from the average threshold-value of the normal ear, or, which is the same thing, from the extent of the amplitude by which the tone is inaudible to the normal ear. The amount of this amplitude, the so-called normal amplitude, is known as the middle value, and forms the terminal point of the dying-out curve. We then follow up the dying-out curve by as many seconds as the difference-time amounted to, and read off in the tables the extent of the amplitude, and the number of normal amplitudes at which the tone died away for the diseased ear.

The proportion threshold-value of the amplitudes for the diseases and normal ears gives the basis for objective measurement. We obtain a direct expression of the hearing of the diseased ear as a fraction of the normal by making its acuteness inversely proportional to the square of the amplitudes. If, for example, in measurements with the *C* fork the threshold-value amplitude is three times the normal, then the hearing of the diseased ear is one-ninth of the normal.

Since the tables give for every amplitude the number of normal amplitudes therein contained, the hearing of the diseased ear can be reckoned in fractions of the normal hearing. All that we have to do is to multiply the number of amplitudes contained in the threshold-value amplitude, and to make the product a fraction, the numerator of which is 1.

Examination of patients variously deaf has shown that in considerable deafness the damage which the hearing has suffered is surprisingly great, whilst diminution of from one-third to one-half is regarded as of slight consequence.

Objective measurements can be made by a deaf aurist if he first has his own defect tested by one with normal hearing. He then proceeds as one with good hearing, except that if the patient is deafer than the aurist his personal difference-time is to be added to that between his ears and that of his patient, in order to discover the difference-time of the patient compared with one of normal hearing. Then by the tables he can find the threshold-value amplitudes and the hearing as a fraction of the normal.

If, contrarily, the examining aurist is deafer than the person to be tested, then the aurist starts with his own difference-time between his own and the patient's ears from the difference-time previously discovered for his own ears.

The results of tests are noted by either noting the extent of the threshold-value amplitude, expressed in the number of normal amplitudes contained therein, or the hearing acuity of the diseased ear is calculated as a fraction of the normal.

A STUDY OF THE DISTURBANCE OF FUNCTION IN ACUTE PERFORATIVE OTITIS MEDIA.

BY PROFESSOR OSTMANN, MARBURG.

Abridged Translation by ADOLPH O. PFINGST, M.D., Louisville, Ky.

(From *Zeitschrift f. Ohrenheilkunde*, XLII., No. 3.)

IN a clinical study of a series of cases of acute middle-ear inflammation, with reference to the accompanying disturbance of hearing, the following routine of examination, suggested by Bezold, was adopted :

1. The range of hearing, or the perception for the highest and lowest tones, was tested.
2. The quantitative acuteness, or the time perception for all of the tuning-forks in the entire scale of the human organ of hearing, was tested.
3. The hearing distance, or the distance at which whispered speech could be heard in a closed room, was measured.
4. Weber's test was made.
5. Rinne's test was made.
6. Schwabach's test was made.

To insure accuracy in my analysis only middle-aged subjects were chosen, and only those who were otherwise healthy and who had suffered no former ear trouble. Furthermore, subjects were selected who had some understanding of music and sufficient intelligence to appreciate the importance of the test so as to make their statements as reliable as possible. The patients were instructed in regard to the routine of the examination, but during the tests their eyes were covered in order to exclude a possible confusion and involuntary misstatements. The examinations were

all conducted away from confusing street noises and were repeated several times, this also to avoid error. The treatment instituted in my cases had for its purpose the establishment of free drainage through the ear canal by the use of strips of sterile gauze in the auditory canal and an external compress of gauze and cotton, and at the same time the correction of any affection of the nose or throat which might be present.

My report includes ten cases, nine of which were examined at intervals of one or several days for several months from the time of their entrance into the hospital. In the other case, the first functional test was made on the forty-fifth day of the ear affection, and was repeated at intervals for ten months.

CASE 1.—Female, nineteen years old, was taken with severe earache, tinnitus, and deafness as a result of a cold. Four days later, when she was admitted to the hospital for treatment, the right drum was lustreless and very much reddened, but not bulging. There was some pulsation in the ear, and pain radiating towards temple. No tinnitus. The voice could be heard at 8 to 11 metres. Paracentesis evacuated only a few drops of blood and serum. As the pain continued, the operation was repeated on the following day. Following the second incision, pus began to discharge freely, and in four hours the pain abated. There was still no tinnitus. H. d. (distance at which whispered voice could be heard), $8\frac{1}{2}$ to 10 metres. As the pulsation continued and the redness of the drum did not disappear, the opening in the drum was enlarged on the 9th day. The discharge became copious, then gradually subsided, the perforation in the drum closing on the 13th day. On the 22d day, H. d., 15 metres.

A noteworthy feature of this case was the presence of severe earache in the first seven days, with but slight if any secretion in the tympanic cavity and the subsequent cessation of pain with the beginning of the discharge. The absence of tinnitus was also noteworthy, as was the fact that the upper limit of perception for the Galton whistle was never lowered.

CASE 2.—Male, nineteen years, had been suffering with ear-

ache on the left side for two days before his admittance to our clinic. For several hours he had noticed a sound as though wind were rushing from the ear and his hearing had been defective. Examination revealed a diffusely reddened drum with considerable bulging in the posterior-inferior quadrant. At the apex of the tit-like protuberance, a bead of pus could be seen exuding from a small opening in the drum. H. d., 9 to 10 metres. The apex of the protruding portion of the drum was abscised and gauze inserted in the ear canal. This was followed by a serous discharge and relief of pain. Four days later, the perforation in the drum had closed, the redness was disappearing, and the subjective noises had become less severe. H. d., 11 to 14 metres. When the patient was discharged, eleven days after admittance, the drum appeared normal and the subjective noises could be heard only by closing the ear canal with the finger. Three days later it disappeared entirely. H. d., 14 to 15 metres.

This case was of interest on account of the mildness of the attack, the slight subjective noises, and the rapid recovery after abscising the protruding portion of the drum.

CASE 3.—Male of twenty-one years, who, four days before he applied for treatment, had an acute coryza, accompanied by severe pain in the left ear, deafness, and subjective noises. H. d., when admitted to the hospital, $4\frac{1}{2}$ metres. No temperature. The drum was incised and a profuse discharge followed. However, pain continued for six days, as did the subject noises, which were compared to the rushing of water. There was also an occasional pulsation. The temperature on the 6th day was 38.5° . After the 6th day the pain and subjective noises gradually subsided, but the profuse discharge of pus continued. By the 12th day it had lessened somewhat and the drum was beginning to lose its redness. Some slight noises continued in the ear. H. d., $3\frac{1}{2}$ to 4 metres. By the 17th day the opening on the drum had closed, the noises were only occasionally noticeable, and h. d. 4 to 6 metres. A week later, when the patient was discharged, the drum appeared normal and the whispered voice could be heard at 15 metres.

This was a moderately severe case in which there was no elevation of temperature before the 6th day. A noteworthy feature was the profuse discharge of pus for eight

days. The subjective noises were marked at the height of the ear affection and began to diminish on the 10th day, could still be heard by putting the finger in the ear on the 27th day, and did not disappear until the 30th day.

CASE 4.—Male, twenty-one years old, was taken, eight days before he applied for treatment, with lancinating pains radiating over the entire left side of the head. The origin of the ear affection was unknown. After four days of earache, deafness, and subjective noises, the ear began to discharge pus spontaneously, which was followed by lessening of the pain and noises. Five days after rupture of the drum the patient applied for treatment. The posterior-inferior quadrant of the drum was bulging and was marked by a small perforation from which muco-pus was discharging. There was also an opening in the anterior-inferior quadrant, as large as a pin-head. Subjective noises, which had been complained of, had by this time disappeared. Temperature normal. H. d., $\frac{1}{2}$ to 2 metres. By the 8th day the discharge had grown considerably less. The drum was still injected and was bulging posteriorly. A week later, both holes in the drum had closed, the membrane having a grayish-white appearance, and the outlines were plainly visible. H. d., 15 metres.

The middle-ear affection in this case evidently had its origin in the naso-pharyngeal inflammation. It was a mild case and improved rapidly after incision of the drum, the pain and subjective noises disappearing rapidly, and the drum and function returning to normal in twenty days.

CASE 5.—A boy of thirteen years, who had been treated for an acute middle-ear inflammation on the left side three years previously, but who had regained perfect function. He had a naso-pharyngeal catarrh. During an acute attack of rhinitis, nine days before his admittance to our clinic, he was taken with a severe aching of the left ear, followed on the next day by spontaneous perforation of the drum, a free serous discharge, and relief of pain. The drum was red and was marked on the posterior-inferior quadrant by a small opening from which serous fluid was exuding. There was no fever. The patient complained of considerable roaring and pulsation in the ear. H. d., 6.5 to 8 metres. The perforation in the drum was enlarged. Two days later, paracentesis had to be repeated, as the discharge had

almost stopped and the drum was again bulging. The otorrhœa became more copious, and after two days gradually began to subside. After a week, the drum was pale, the noises had almost disappeared, and h. d. was 10.5 metres. Two weeks after beginning of the trouble, the perforation in the drum had closed, and the drum, with the exception of slight redness over Schrapnell's membrane, had returned to normal. There were no subjective noises. H. d., 11.5. When discharged, four days later, he had normal hearing; h. d., 15 metres. Ten days later, conditions had not changed. Two months later, the redness of Schrapnell's membrane was no longer present, but he had a h. d. of only 12 metres.

The features of this case were the copious discharge for nine days and the gradual lessening of the discharge after enlargement of the perforation in the drum, with the disappearance of the subjective noises six days later. The continued redness over Schrapnell's membrane seen in this case was an unusual feature; also the return of hearing to normal and a subsequent decrease in hearing.

CASE 6.—A male, thirty-five years of age, who had had rhinopharyngitis for several days, was taken, five days before he applied for treatment, with pain in the left ear, followed by defective hearing and subjective noises. After three days, the drum ruptured spontaneously and the pain and noises stopped almost at once. When first seen at the clinic the posterior portion of the drum was red, and in its posterior-inferior quadrant was bulging, and contained a small perforation, from which a scant discharge was noticeable. The patient complained of whistling and roaring noises and occasional pulsation in the affected ear. No fever. Hearing so defective that words could not be understood. The protruding portion of the drum was incised and in twenty-four hours the noises had diminished, and patient could hear whispered voice at 2 to 3 metres. A second paracentesis was made three days later, as the old opening had closed and the membrane was still bulging. This was again followed by a copious discharge. Following this there was a gradual lessening of the redness of the drum and a rapid disappearance of the tinnitus, and by the 11th day patient had h. d. 9.5 to 13 metres. This patient was not seen again for almost two months. The drum was then slightly retracted, the

perforation had closed, and the drum appeared gray and lustreless. H. d., 14 metres.

This was a mild case beginning with an acute nasopharyngitis. The subjective noises lasted for eleven days, then disappeared rather suddenly, simultaneously with an improvement in function.

CASE 7.—Male, twenty-three years old, four days before applying for treatment had an acute coryza, followed by earache on the left side. The pain continued, and one and a half days before his admission to the hospital the left ear began to discharge pus. Subjective noises—roaring—began soon after beginning of the earache and apparently became more severe after rupture of the drum. Examination revealed redness of the drum and the ear canal in close proximity of the drum.

A scant serous discharge was noticeable in the posterior-inferior quadrant exuding from a minute perforation in the drum. The patient complained of throbbing in the ear and considerable roaring. He was unable to hear the voice close to the ear. Temperature 38° C. The perforation in the drum was enlarged, but for two days the discharge remained unchanged. The redness, however, lessened and the pain subsided. Roaring continued. By the fourth day the patient could hear sounds at 3 metres but was unable to recognize words. On the seventh day whispered words could be recognized close to the ear. The discharge stopped on the tenth day. By this time h. d. was 3 to 6 metres. Ten days later only a faint redness was visible along the malleus and patient was discharged. It took twelve more days for the hearing to return to normal.

The features of this case were the elevation of temperature lasting for several days, the marked decrease of hearing during the climax of the disease, and the beginning of the subjective noises with the onset of the pain, and their continuance for twelve days.

CASE 8.—Male, twenty-one years old, had an ear affection of short duration in 1896, the nature of which could not be determined, and after which there was complete restoration of function. Two days before the patient presented himself for treatment he had pain in his throat, which was followed by severe pain in

the left ear, and later defective hearing and subjective noises. Temperature 38.5° C. Examination on the third day revealed a very much reddened drum, the posterior part of which was protruding and contained a vesicle at its apex. Pain and subjective noises were still complained of.

The pharynx was inflamed. H. d., 0.5 to 0.75 metres. Incision of the drum evacuated quite a quantity of sero-sanguineous fluid, and was followed by a rapid improvement in the general condition of the patient. The discharge continued profusely for about seven days, then gradually subsided. The noises in the ear, which were of a hissing character, continued. As the drum was still red on the ninth day, there was a slight elevation of temperature, and as the h. d. was only 0.3 metre, a second paracentesis was performed. A free discharge followed for several days, then the flow continued less profusely for thirty-seven days before the perforation closed. The temperature remained slightly elevated for several days after the second operation, and the subjective noises continued. Two weeks after the beginning of the trouble, h. d. was 1.25 to 2 metres, and at the end of a month it had increased to 4 metres. Thirty-seven days after the beginning of the trouble, the drum was complete, and, with the exception of the membrana Schrapnelli, had its normal color and appearance. The subjective noises, which were compared to the rushing of water, continued. H. d. 9.5 metres. This patient was last examined eighty-four days after the origin of the otitis. The drum appeared slightly thickened and somewhat retracted. The subjective noises were still present though not pronounced. The Eustachian tube was permeable. H. d., 14 metres.

The exceptionally long and profuse discharge, lasting for five weeks, was of interest in this case, as was the persistence of the elevated temperature after the discharge had been established. The beginning of the subjective noises with the onset of the otitis and continuance after subsidence of the ear affection was also worthy of special note.

CASE 9.—Male of twenty-one, with history of some non-perforative ear affection two years previously with recovery of perfect function. Ten days before applying for treatment he was suddenly taken with severe earache on the right side during an attack of pharyngitis. The pain in the ear was followed on the next day by subjective noises and deafness. There was no

discharge. These symptoms continued until patient presented himself at the clinic. Examination showed drum and ear canal red, and drum bulging in the posterior portion. The patient was unable to hear the voice close to the ear. The posterior-inferior quadrant of the drum was incised, following which the noises ceased almost at once and the ear began to discharge pus profusely. On the following day his h. d. was 3 metres. The discharge continued only four days, and two days later the perforation in the drum had closed and the redness much diminished. H. d., 9.5 metres. Several days later a small calcareous area was noticeable in the anterior half of the drum. Six months later, when this patient was examined again, the drum was slightly atrophic and retracted. H. d., 7 to 8 metres.

This was a very mild case, the otorrhœa which followed the paracentesis subsiding in five days, and the subjective noises ceasing within twenty-four hours after incision of the drum. Normal function was never recovered.

CASE 10.—This was a case of bilateral, perforative, middle-ear suppuration following tonsillitis in a patient who had no history of former ear trouble. The patient, a man of twenty years, did not apply for treatment until he had been sick for forty-five days, and then only on account of the annoying subjective noises. He gave the history that his trouble began with a severe earache on both sides lasting for seven days. Paracentesis on the sixth day gave him no relief, the attending physician noticing that the mucous membrane of the tympanum presented in the wound after the incision of the drum. Temperature then 40° C. On the following day a sero-sanguineous discharge began which lasted for four weeks. Subjective noises on the left side continued. Examination on the forty-fifth day showed considerable difference in the acuteness for different words, some being recognized at 14 metres, while some were recognized at only the fraction of a metre. This continued for some time, and even after eleven months when some words were understood at 15 metres others could be heard at only 6 to 7 metres. Subjective noises were still complained of at the end of a year.

ANALYSIS OF CASES.

A. *Range of Hearing*.—Very little attention is given in our text-books on otology to the effect of acute middle-

ear inflammations upon the range of hearing. Burkhardt-Merian has made the observation that the presence of an exudation in the tympanum seldom affects the perception for high tones, and when it does he accounts for the defect in a pressure on the fenestra ovalis, or an increased pressure in the labyrinth. In a patient in whom the drum was absent, he made the observation that direct contact of the fenestra ovalis with a cotton probe saturated in glycerine was followed immediately by a decrease in the power of perception for high notes. Bezold has noted, in eighteen cases of acute purulent otitis media with permanent perforations or marked scar formation, a decrease in the perceptive power for high notes tested with the Galton whistle. One of the cases also showed an inability to perceive some of the lower notes. The defects were accounted for by Bezold in the disease of the labyrinth. Brunner also attributes the loss of perception for high notes to temporary involvement of the labyrinth. Habermann and Moeller have noticed that the defects in the high tones of the Galton whistle extended in most cases as low as c^6 or c^5 , and in some cases to c^7 . I have been able with my cases to corroborate the observations of these authors, as in all but one instance the high limit of perception was reduced. The amount of reduction was very variable, the high limit of perception in two cases being as low as d^5 . The observation was also made in my cases that the low limit of perception is affected more frequently than is generally believed, as an elevation in the low limit was noted in every one of the cases. The normal limits, both for low and high tones, were again reached after the inflammatory symptoms subsided. The elevation of the low limit has been explained in a diseased condition of the sound-conducting apparatus, and a consequent poor conduction of low notes. The lowering of the high limit is believed to have its cause in disease of the labyrinth. From my observation it is evident that a prognostic significance can be attached to the lowering of the upper tone limit. Based upon clinical experience, we may conclude that the greater the extent of the reduction of the upper tone limit and the longer the reduction, the

less the probability of a rapid recovery from the disturbance of function and the less the probability of the disappearance of the subjective noises.

No satisfactory explanation has been offered for the involvement of the labyrinth in these cases. In the less severe cases, where the upper limit of sounds was lowered for only a few days, a slight inflammatory condition, or hyperæmia of the labyrinth, was probably present. Not so in the severer cases, where the lowered high limit continued after all inflammatory symptoms had disappeared. According to the histological examinations of Habermann, a plastic inflammation takes place in the inferior portion of the tympanum, the extension most likely taking place through the fenestra rotundum. The observation of Burkhardt-Merian that the upper range of perception was lowered by making pressure on the fenestra rotundum with a cotton probe has suggested the possibility of an exudation on this membrane as a cause of this phenomenon, during acute otitis media. However, to justify this theory, the hearing for high tones would have to be re-established with lessening of the exudation, which, in my observation, has not been the case. The defect in the upper range of hearing in my cases usually began or became exaggerated soon after the paracentesis, and continued in several instances for some time after the inflammatory symptoms had disappeared.

B. Time Perception.—Tests made according to the routine suggested by Hartmann to determine the disturbance in the time perception for the octaves C — c⁴ during the course of acute middle-ear inflammations showed that the lower octaves were most affected. For the high octaves, the time perception was shortened in a varying degree in nearly every case, but the normal time perception was regained rapidly in all but two cases. In one of these it took eleven and a half months for a slight reduction in the time perception for the octaves c³ and c⁴ to disappear. The interesting clinical observation was also made that the diminished time perception for the higher octaves stood in direct relation with the subjective noises. In the one case in which the otitis ran its course without subjective noises,

the time perception for the high octaves was also not affected, and in the two cases in which the ringing noises continued for a considerable time after the subsidence of the otitis a lessened time perception for the high octaves was also noted for a long time. This would justify the conclusion that the two symptoms are associated, and that they have a common cause, probably circumscribed pathological changes in the cochlea.

C. Hearing Distance for Speech.—The functional examination of the ear, as tested with speech, is not of great value for scientific research. The method is unreliable, owing to errors of judgment and frequent inattention on the part of the patient and the impossibility of the surgeon to speak with the same strength of voice and with the same distinctness at each examination. Notwithstanding these imperfections in this test, the degree of deafness for speech can be fairly well determined, and serves as an aid in determining functional defects. A certain relation was found to exist between the decrease in the hearing distance and the lowered upper range of perception for the Galton whistle, as well as a lessened time perception for the higher tuning-forks (c^8 and c^4), which would suggest a common cause of these disturbances—probably a diseased labyrinth.

D. Weber's Test.—In all of my cases, the tone of the tuning-fork on the vertex was perceived most distinctly on the affected ear. It is a noteworthy fact that normal conditions or equal perception on both sides were regained in but four out of the nine cases. In two of the cases perception was increased, and two entirely localized on the affected side for months.

E. Rinne's Test.—Throughout the entire course of all of my cases, a lengthened perception through the bone for the C fork was observed, and in two of the cases it persisted after the ear affection had run its course. Similar observations have been made by Bezold. The time of perception through the bone was subject to daily variation in my cases, but in nearly all of them reached its maximum during the last stages of the otitis, and not at the height of the disease, when the air perception was shortened in duration. In most

of the cases, the time perception through bone began to increase as soon as the height of the inflammatory attack was passed, but the time perception through bone continued to increase for several more days, when a rapid increase through bone and decrease through air followed. From these observations we can deduce that certain conditions exist at the height of an acute perforative middle-ear inflammation, which reduces the perceptive power through the air and increases the time perception through bone. It is probable that both the sound-conducting and sound-perceiving apparatus is involved in acute middle-ear inflammation. The degree of the involvement of the primary tympanic disease and the secondary vestibular affection varied in different cases. The increase in bone-conduction, after the ear trouble had apparently run its course, can only be explained in a subsidence of the inflammatory condition within the labyrinth and tympanum and a subsequent increase in rigidity of the ossicles. After continued improvement in the inflammatory condition in the middle ear, conditions grew less favorable to bone-conduction and more favorable to conduction by air.

ANNUAL REPORT OF THE OTOLARYNGOLOGICAL CLINIC AND POLYCLINIC (PROF. SIEBENMANN) IN BASEL.

FROM JANUARY 1 TO DECEMBER 31, 1902.

COMPILED BY DR. E. OPPIKOFER, FIRST ASSISTANT.

Translated by Dr. A. WIENER, New York.

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THE number of patients treated in the Polyclinic between the years 1901-1902 was 3687. The majority ranged between the ages of one and fifteen years. Out of 2793 patients treated, the external ear was involved 730 times, the middle ear 1799, and the inner ear 264 times. In the Clinic, during the same period, there were treated 366 patients. The majority of these suffered from middle-ear disease. There were 147 operations performed. The simple opening of the mastoid was done 50 times, and the radical operation with plastic, according to Siebenmann, 63 times. Attention is called to the absence of perichondritis in cases operated on by this method.

The following cases reported are of interest.

Otitis media purulenta non perforativa on the right side, with perisinuous abscess and infected sinus thrombosis. Pyæmia. Metastases in the lungs and pleura. Enlargement of the liver and spleen. The contents of the sinus was removed and the jugular was tied. Recovery.

Patient was twenty-five years of age. Admitted on the 2d of March, and discharged on the 24th of April.

After an attack of influenza, with an involvement of the accessory sinuses of the nose, there occurred an acute otitis media on the right side, with recurrent attacks of pain. After suffering several days, he presented himself at the medical clinic, where a provisional diagnosis of erysipelas was made. A few days later there occurred a bronchitis on both sides, which, however, rapidly subsided. The continuous high temperature and the recurrence of pain in the ear, although insignificant, finally led to a second otoscopic and ophthalmoscopic examination, with a resulting diagnosis of purulent sinus thrombosis. An operation was performed and revealed a perisinusitis and broken-down thrombus in the sinus. The jugular was tied. Following the operation, metastases showed themselves in the pleura and lungs, which, however, after fourteen days disappeared. Attention is called to the fact that the tying of the jugular, when the diagnosis of thrombosis of the bulb is positive, should be performed before opening the mastoid (Brieger).

In this patient with pyæmic symptoms and pain to pressure over the retromaxillary region, a diagnosis of thrombosis of the bulb and jugular vein was almost a positive fact. The operation, however, revealed the retromaxillary pain as due to an infiltration in the tissue around a terminal cell in the mastoid process. In regard to optic neuritis, the author feels that, although the statistics are not sufficiently convincing to draw any positive conclusions therefrom, probably in purulent sinus thrombosis its occurrence is rather to be expected.

Chronic otitis media purulenta on the right side, with purulent sinus thrombosis; metastatic abscesses in both pleural cavities and lungs. Hemorrhages in the mucous membrane of the bladder. Operation. Death.

Patient seven and a half years of age. Admitted on the 1st of January, 1902. Died on the 4th of January, 1902.

On admission, the somnolence, the violent headaches, high temperature, the catarrhal symptoms in the lungs, in connection with the ear findings, pointed toward a pyæmia due to a purulent sinus thrombosis. The diagnosis was strengthened by the previous history of chills and vomiting, which ceased to occur just previous to his admission into the hospital. The operation,

which was performed on the first day of admission, showed that the external and anterior wall of the transverse sinus in the neighborhood of the bulb was necrotic. As soon as the bone was removed, fetid pus at once presented itself. The sinus was cleaned out, but the jugular vein was not tied.

The author comments upon this fact, especially in regard to a hemorrhage which took place from the jugular bulb three days after the operation. He believes that had the jugular been tied early it might have been of some advantage. In regard to the pyæmic and metastatic abscesses which the autopsy showed to be of some duration, he believes that the advantage to be gained by tying the jugular in this case would have been questionable. The occurrence of the colon bacillus as a bacteriological finding in sinus thrombosis is particularly emphasized, as its occurrence is uncommon. The anatomical diagnosis at the autopsy confirmed the clinical diagnosis.

Left-sided perisinusitis after acute catarrhal otitis media. Hearing at the time of the operation normal. Recovery.

Patient twenty-five years of age. Admitted January 30, 1901. Discharged March 5, 1901.

At the time when the patient came under observation, the inflammation in the middle ear had ceased to exist. The tympanic membrane appeared normal, and the hearing distance for a whisper was 22mm. While the middle ear was in a state of recovery, a pus-secreting cell of the mastoid process in the neighborhood of the sinus led to a perisinuous abscess and a perforation into the posterior fossa. Eventually the pus found its way through the emissarium mastoideum, and appeared as a superficial abscess under the periosteum of the skull. With the exception of pain, which was present only in the beginning, this extradural abscess caused no symptoms whatsoever. Three weeks after the appearance of the subperiosteal abscess, vertigo, a slight rise in temperature, and the Romberg phenomenon made their appearance. The bacteriological examination showed a pure culture of pneumococcus.

At the operation, the antrum was not opened. The author follows the rule that, in uncomplicated cases of empyema of the mastoid process, the antrum is not opened when the otoscopic

examination and the test for hearing show that the disease in the middle ear is quiescent, and, furthermore, when during the operation the bone in the neighborhood of the antrum is found healthy. In doubtful cases the antrum is laid bare.

The author takes occasion to give some statistics in reference to the etiology and occurrence of extradural abscesses as seen in his clinic.

Contrary to the general rule, they appeared to occur more frequently on the left side. On the other hand, the more serious complications, like sinus thrombosis, meningitis, and brain abscess, commonly occurred on the right side. Complications were more frequently witnessed after acute pain, chronic middle-ear disease. The male individual was more often affected than the female. In regard to age, the majority occurred between thirty and forty years of age.

Chronic otitis media purulenta on the left side, with empyema of the mastoid process and necrosis of the facial nerve; acute otitis media purulenta on the right side. Tuberculosis of the larynx, lungs, and intestines. Tubercle in the cerebellum and pons.

F. J., age six months. Admitted 27th November, 1900. Died 30th June, 1901.

After measles there occurred a purulent disease of the middle ear, with empyema of the mastoid process on the left side. As the temperature was very slight, and the lungs and other organs normal, the prognosis appeared apparently good. At the operation, however, from the extensive necrosis which was revealed, together with the result of a microscopic examination of some granulation tissue which was removed from the antrum, the nature of the process was shown to be tubercular.

The author, on account of the negative findings in the lungs early in the disease, puts the question whether the tuberculosis present in the middle ear was the primary source of infection. He believes with such an extensive tuberculosis of the inner organs as the autopsy revealed, that probably after all at the beginning of the ear disease there existed some diseased bronchial glands and deep-seated lesions in the lungs, which could not at that time be demonstrated.

As these did not become manifest until months after the beginning of the otorrhœa, the infection could not be carried by sputa through the Eustachian tube, but was rather of hæmatogenous origin.

The necrosis present in this child when it died was an extensive one. It involved the os tympanicum, all the walls of the tympanic cavity, together with the aditus antri, antrum, and mastoid process. The dura of the middle fossa was laid bare, but no infection of the brain cavity resulted. The Fallopian canal in the posterior wall of the tympanic cavity was empty, showing complete necrosis of the facial.

Sarcoma of the right middle ear, involving the labyrinth and both cranial fossæ. Operation. Death.

L. S., seven and three quarters years of age. Admitted December 6, 1900. Died January 7, 1901.

Patient had suffered from a tubercular affection of her skin and bones. A facial palsy appears on the right side. At the same time there is discovered in the auditory meatus a growth, which although removed several times nevertheless quickly recurs. There is no otorrhœa, but partial deafness exists in this ear.

The hearing test shows the characteristic findings for middle-ear disease. The electrical examination of the facial nerve shows the reaction of degeneration. Microscopic examination of the growth revealed it to be a spindle-celled sarcoma. The growth could not be completely removed through operative means. It had extended toward the mastoid process and also toward the brain. The tegmen was wanting over the tympanic cavity, antrum, and aditus. The tumor soon began to grow into the wound and into the external canal of the ear. Its growth into the middle fossa soon brought on brain-pressure symptoms: optic neuritis, third- and fifth-nerve paresis on the right side, together with a paresis on the opposite half of the body. The patient finally became comatose, and died half a year after the recognition of the first symptom, which was facial palsy. The autopsy revealed a tumor, about the size of a billiard ball, encapsulated, extending through the tegmen tympani and dura into the middle fossa, forcing the brain over against the opposite side of the skull. A second tumor was also found, about the

size of a cherry, which appeared to grow from the meatus auditorium internum into the posterior fossa. Microscopic examination proved this tumor to be a polymorphous-celled sarcoma. The intercellular substance in the main tumor was of a hyaline nature.

The author believes that the tumor primarily took its origin from the tympanic cavity. What strengthens this view is its behavior towards the dura which was attacked only in circumscribed places. Again, the presence of longitudinal fibres in the pedicle pointed directly towards the middle ear as the point of origin. The early appearance of the facial palsy before any cerebral symptom also speaks for the middle ear. Author goes so far as to place the probable point of origin at the junction of the aditus and antrum. He believes that in the early stages of sarcoma of the middle ear it is almost impossible to make a diagnosis. Pain, which is so characteristic a feature in the early stages of other malignant tumors, is wanting in sarcoma.

Early paralysis of the facial nerve is usually a very prominent symptom in all forms of tumors. In addition, usually an examination of a portion of the growth decides the matter, but not always. The author calls attention to the bad prognosis, as the diagnosis is usually made in the operable stage. That the epithelium of the mucous membrane of the middle ear may become horny through the influence of a malignant tumor is well shown in this case. This is contrary to the Habermann-Bezold theory, which attributes this horny condition only to the wandering into the middle ear of epidermal cells.

Chronic otitis media purulenta on the left side with cholesteatoma and suspicion of an intracranial complication. Temporary resection of the skull. Death. Glioma of the fourth ventricle.

W. G., twenty-two years of age. Admitted on the 9th of May, 1901. Died on the 11th of May, 1901. In a young, strong, male individual, with purulent middle-ear disease on one side and the remains of such on the opposite side, there were present, increasing in severity, symptoms of brain pressure. Exploratory

opening in the middle and posterior fossæ gave negative results; but strengthened the suspicion of a brain tumor. No clue was obtained in regard to the location. The patient rapidly succumbed. The absence of all symptoms pointing toward an involvement of the hemispheres, in addition to the absence of any disturbance of the auditory apparatus, and the prominence of the cerebellar symptoms, speak, as the author suggests, in all probability against the diagnosis of abscess.

The absence of fetid pus or profuse secretion at first persuaded him against operation.

A microscopic examination made of a number of sections in series of both labyrinths fails to substantiate the fact that increased brain pressure must produce functional and anatomical changes in the labyrinth. Not the slightest sign of any depression of Reissner's membrane was to be found. An interesting observation in this case is the author's explanation how cholesteatoma can originate, through the retraction and pressure inwards into the aditus of an atrophic tympanic membrane. This eventually becomes perforated at its most dependent portion, and thus the path is opened for the wandering into the aditus of epidermis. It supports the theory of Bezold, that the retraction of the tympanic membrane in catarrhal condition of the Eustachian tube and naso-pharynx is one of the contributing factors in the production of cholesteatoma.

Abscess in the left orbit, due to the rupture of a caseous empyema of the antrum of Highmore and ethmoidal sinusitis into the orbit. Metaplasia of the mucous membrane of the antrum of Highmore. Two operations. Recovery.

W. B., age thirty-nine years. Admitted on the 15th of August, 1902. Discharged on 27th of September, 1902.

A male, thirty-nine years of age, was afflicted with what apparently appeared as an acute purulent inflammation of the accessory sinuses. After one week he appeared to have recovered. After four days, however, he was attacked with severe headache and the appearance of a purulent secretion from the nose. Two and a half weeks after the first symptom of his illness, he developed the typical picture of an orbital abscess. The operation

revealed two perforations into the orbital cavity. The one was about $\frac{1}{4}$ cm in size, and lay on the floor of the orbit at the posterior superior angle of the antrum of Highmore. The other was about the size of a pin's head and represented the middle ethmoidal region (an opening for a third vessel which was enlarged through caries).

The cause of this entire condition was attributed to the diseased antrum, which was filled with a most ill-smelling caseous mass. On the other hand, the ethmoidal cells merely showed a discoloration and catarrhal condition of the mucous membrane and the contents of the cells not abnormal.

The author comments upon the fact that small canals in bone, which serve for the passage of veins, as well as a thin wall or dehiscence, very often assist and make easy such perforations as took place in this case. He explains their origin as follows: Through the pressure of the accumulated exudation and its accompanying virulence, brought about through an acute exacerbation, small areas of necrosis or serious nutritive disturbances take place in the already inflamed mucous membrane. Under the influence of a rarefying otitis or periostitis, brought about by carriers of infection from such a mucous membrane, a perforation eventually takes place. The chill and the further spread of the infection through such a vessel opening demonstrate the fact that the patient suffered from a phlebitis or beginning pyæmia. The case is of especial interest because it is the first case in which a metaplasia of the mucous membrane of the antrum of Highmore has been demonstrated. In this case there was found a deep red, markedly thickened mucous membrane with uneven surface. Within the folds nothing but stratified pavement epithelium could be seen. The microscope thus reveals that the author had, in the beginning, to deal not with an acute accessory sinusitis, but an acute exacerbation of a latent empyema of the antrum of Highmore and a similar condition in the ethmoidal cells.

In regard to the prognosis of an empyema of the antrum with ill-smelling caseous contents, it appears to be particularly favorable. According to Avelli and others, complete recovery has been observed after one washing out of the

cavity. The author's case, however, is one which did not respond so readily to treatment. Whether those cases in which the mucous membrane has undergone a metaplastic change are especially unfavorable remains at present an open question. The author calls attention to the fact that in purulent disease of the middle ear the complicating metaplasia and its association with cholesteatoma formation is a very serious matter, leading very often to sinus thrombosis. He then speaks of the analogous condition which may attend metaplasia of the accessory sinuses, viz., phlebitis and periphlebitis of the ethmoidal and ophthalmic veins.

The outcome of the above case was a particularly favorable one. The vision remained normal, and after the abscess was drained the symptom of the orbital phlegmon disappeared. The ethmoidal cells were opened from the orbital cavity and curetted. The antrum was opened from the canine fossa.

Alveolar periostitis of the superior maxilla. Orbital abscess. Purulent breaking down of the internal pterygoid plexus and purulent thrombosis of the cavernous sinus. Pyæmia. Exposure of the cavernous sinus. Death.

E. L., thirty-three years of age. Admitted on the 10th of March, 1902. Died on the 26th of March, 1902.

Patient complained at first of pain over the right superior maxillary bone. The upper right canine tooth was carious and tender to pressure. This tenderness was also evident over the posterior portion of the canine fossa, and in the neighborhood of the right superior maxillary articulation. After the tooth was extracted there was found a simple periostitis without any accumulation of pus. On admission to the hospital the diagnosis of an abscess in the right orbit was made. There was marked exophthalmus and all the movements of the eyeball were limited. The conjunctiva was chemotic. There was ptosis with œdema of the upper lid. In addition there were excruciating headache, high temperature, chills, vomiting, loss of appetite, and constipation, symptoms which are commonly seen in orbital abscess.

The question of interest in this case, which the author discusses, is from what source did the abscess in the cellular

tissue of the orbit take its origin, and then thus to trace its farther course into the sinus cavernosus.

That an orbital abscess may be traced to an affection of a tooth is known, but it is very uncommon. What is especially to be emphasized in this case is the apparently insignificant inflammation around the tooth, with the consequent formation of an abscess in the orbit. The author calls attention to the case of Pagenstecher, which was very similar to his own.

In regard to the explanation offered as to how the infection found its way from the tooth into the orbit and sinus cavernosus, the author proceeds as follows: He traces the infection to the internal pterygoid plexus producing here a thrombophlebitis with consequent purulent disintegration. He then argues the question, whether from this point the orbital tissue was next involved, and following this the cavernous sinus, or *vice versa*, or whether both were involved about the same time and independently of each other. He believes that the orbital phlegmon preceded the sinus thrombosis, on account of the prominence which it assumed early in the disease and the satisfactory explanation which is offered for all the symptoms present. The author does not wish to claim, however, that the cavernous-sinus thrombosis may not, after all, have been the first result of the infection. Such a thrombosis with a thrombophlebitis of the ophthalmic vein may resemble the picture of an orbital phlegmon. Of interest in this case is also the fact that the thrombosis of the cavernous sinus remained confined to one side. The explanation offered is based upon the histological and bacteriological findings of Mitvalsky in cases of this kind. He found that, at the point of junction with other vessels, real thrombi form which, in spite of the colonies of bacteria in their neighborhood, remain free from infection, and offer the greatest resistance to the spread of the infectious process.

Ten days after the first appearance of the exophthalmus the vision was reduced to half. This was attributed to pressure upon the optic nerve within the orbit. It is not denied, however, that such reduction of vision may be

brought about by a thrombophlebitis of the central vein or an optic neuritis. An optic neuritis was discovered later in the disease, but is attributed by the author to the operation of laying bare the cavernous sinus.

In the above case the carious tooth was extracted, the antrum of Highmore opened through the canine fossa, and the orbit at its floor. The intraorbital pressure was at once diminished, but the multiple small abscesses in the orbital cavity remained undisturbed. The author believes an incision at the orbital margin with drainage to be preferable to opening the orbit from the antrum, even in an apparently hopeless case. He calls attention to the single remarkable case of Stocker, which was successfully treated in this manner.

As the patient's general condition did not improve and the case began to look more serious, it was thought that probably after all the symptom-complex was not brought about by the periostitis around the carious tooth, but by the chronic purulent ear-disease which also existed in the right ear of this patient. The patient was absolutely deaf in this ear, and it was thought that probably the labyrinth had been involved. (Later the microscopic examination simply showed a marked catarrhal inflammation of the mucous membrane of the middle ear. Otherwise everything was normal. The deafness was probably of central origin.) For the above reason the transverse and cavernous sinuses were laid bare and found to be normal. Had the cavernous sinus been opened, the author believes that pus might have been found. The results following the opening of the cavernous sinus are not encouraging. The author has found in the literature four cases. Only in one case, that of Knapp operated upon by Hartley, in which an aseptic thrombus was found, in a patient suffering from a traumatic sarcoma of the orbit, so far as the direct result was concerned was the outcome favorable. The patient died, however, a few months later from a recurrence of the growth.

REPORT OF TWO CASES OF MASTOIDECTOMY, SINUS THROMBOSIS, LIGATION AND RESEC- TION OF JUGULAR VEIN; RECOVERY.¹

By J. F. MCKERNON, M.D., NEW YORK.

(With one temperature chart.)

The first case is a child, twenty-six months old, male, well nourished, and, save for an acute otitis one year ago, had never been ill before. The case was seen on Feb. 15, 1905. There had been a rupture of the left drum-membrane two days previous. Upon examination, the external auditory canal of the right side was found filled with a muco-purulent discharge, the drum membrane was bulging; in the posterior quadrant there was a small opening just above the tubal entrance into the middle ear. A smear of the discharge was taken, which upon examination proved to be a staphylococcus infection. There were no physical signs within the canal or externally of mastoid involvement. The temperature was 102° F. and the child somewhat drowsy. The drum membrane was incised, and the temperature in twelve hours was 99° F. For the next four days the ear drained freely, the temperature at no time being above 100° F. On the fifth day there was a rise of temperature to 103.2° F., the physical signs in the canal and middle ear showed beginning involvement of the mastoid, and there was some tenderness of the mastoid on pressure. The temperature remaining the same, the mastoid was opened on the following day, and contained only a very few drops of pus in the antrum, there being no general involvement of the structure.

For the next nine days the child did very well, the temperature at no time rising above 100° F. The wound looked healthy, except a small spot over the sigmoid groove at the knee, which

¹ Read before Section on Otology, N. Y. Academy of Medicine, April 13, 1905.

was not covered with granulations. On the tenth day there was a gradual rise of temperature to 103° F. The child was fretful, did not rest well, and did not take his food without coaxing. During the night the temperature dropped to 99° F., and on the following day reached 103.5° F. Upon inspection of the wound at this time it was found looking badly. All the granular surface was bathed in pus, and there had exuberant granulations grown over the spot on the groove, before spoken of, which were flabby and also bathed in pus. The wound was cleansed and a wet dressing applied, and the temperature dropped within six hours to 99.2° F. The child was more comfortable, rested better, and partook of nourishment well. By twelve o'clock the following day the temperature had risen to 104.8° F. The wound was inspected, and the granulations over the sigmoid groove were soft and flabby and bathed in pus. A diagnosis of involvement of the sinus was made, and permission asked to operate, which was granted. The sinus was exposed from above the bulb to one inch posterior to the knee. The dura covering the sinus in this locality was lustreless, somewhat whitish in color, and the sinus was easily compressible. Below the knee the bulb was dark in color, but still retained a grayish tint. It was opened and a clot and broken-down material expelled. Free hemorrhage was established at both ends, a dressing applied, and the child returned to bed. The temperature dropped quite suddenly to 101° F., and remained so for twelve hours, after which there was an abrupt rise to 104.2° F. The child's condition was better, he took his nourishment well, and appeared stronger. For the next four days the temperature ranged between 103° F. and 100.8° F. On the fourth day the temperature rose to 104.2° F., the child refused nourishment, was exceedingly restless, and looked septic. The vein was examined in the neck, but no tenderness or enlarged glands could be discovered. Believing we had a still further source of infection which was probably in the bulb, or vein, or both, permission was asked to operate again. The parents requested a delay for a few hours, and during the next twelve hours the temperature dropped to 101° F. Some two hours after this, the child's hands and feet became cold and clammy, and there was a rise of temperature to 105.2° F. There was no vomiting, the pulse rate was 160, and the child looked very septic. Permission was now granted to remove the vein, which was done under chloroform anæsthesia.

The vein was ligated below the clavicle and resected to its point of exit from the skull. The facial vein was found involved and nearly an inch of this was also resected. There were a large number of infected glands along the course of the vein, and also others lying far posterior to it, one of which was broken down. The sheath covering the vein was thickened in its upper two-thirds. The vein contained a clot for an inch and a half below the skull. The wound was closed with a continuous suture which later had to be removed, owing to suppuration. The case has made an uninterrupted recovery and at the present time is going out-of-doors every day. There was a gradual diminution of the temperature with one or two exceptions, these exceptions probably being due to overfeeding. I show you the temperature chart and also the pathologist's report of the findings in the vein and glands examined.

The second case is that of a woman about thirty years of age, who developed an acute otitis following a partial turbinectomy done by a prominent throat surgeon, and in which the most profound systemic infection followed. The otitis developed twenty-four hours after the turbinectomy was performed. An incision was made in the right drum-membrane, which was found bulging, and pus evacuated. A smear of this discharge showed a large number of streptococci, with a few pneumococci. The temperature at this time was 100.2° F. The mastoid even at this time was exquisitely tender. For the next two days the patient complained of severe pain in her ear, and over the mastoid when pressure was exerted. The temperature did not rise above 100.2° F. On the third day there were physical signs in the canal and middle ear of mastoid involvement and a complete mastoidectomy was done. The bone was found infiltrated throughout, was very dark in color, and the infection extended far posterior to the sigmoid groove. Within a few hours there was a sudden rise of temperature to 103.8° F., and quite as sudden a drop to 98.4° F. For the next six days the case pursued the usual course of a post-operative mastoid, except for a little more fluctuation of temperature than the average; at no time was it above 100.4° F.

On the tenth day following the mastoidectomy there was rather a sudden rise to 103.8° F.; the patient complained of headache, and referred most of her head pain to the vertex. During the night the temperature dropped to 101.8° F., to rise on the fol-

lowing day to 105° F. A diagnosis of involvement of the sinus was made, but owing to the extreme weakness of the patient, who had to be constantly stimulated, it was decided that it would be better to wait for a time before operating. The following day a consultation was held with a general surgeon, who said he thought the case was one of general pyæmia, and that he did not believe there was any involvement of the sinus. For the next five days all our efforts were directed to keeping up the patient's strength, the temperature ranging all the way from 104° F. to 97° F., as you will see by the temperature chart. On the sixth day, the patient being stronger, permission was granted to operate, and the sinus exposed from the bulb almost back to the torcular. The bone covering it was very dark, almost black in color. From the knee backward the dura was lustreless, and over a greater portion of its area white or yellowish. It was opened freely, and a clot removed from the knee which extended backward toward the torcular for about two inches. In the lower part of the vein there was a disintegrated clot with pus present. Upon finding this condition it was decided to expose, ligate, and resect the internal jugular vein, which was done. There were a number of enlarged glands along the course of the vein which were removed. After the removal of the vein, the lower end of the sinus was freed from the broken-down material which was present, and the wound in the neck closed by a continuous suture. She bore the operation very well, the only stimulation that was used being a hot saline thrown into the bowel during the latter half of the operation, and within half an hour after she was placed in bed.

The subsequent history was uneventful, as you will see from the chart, there being only one rise of temperature on the second day, and that was caused by a focus of pus in the neck, and on account of this two of the stitches were removed. The healing was rapid, and the resultant scar smaller than might have been expected from the suppuration that at one time threatened the soft tissues in this region.

The pathologist's findings in this case were that the clot in the vein, the walls of the vein, a portion of the sheath over the vein, and the glands removed, all contained large numbers of streptococci. It is interesting to note in this

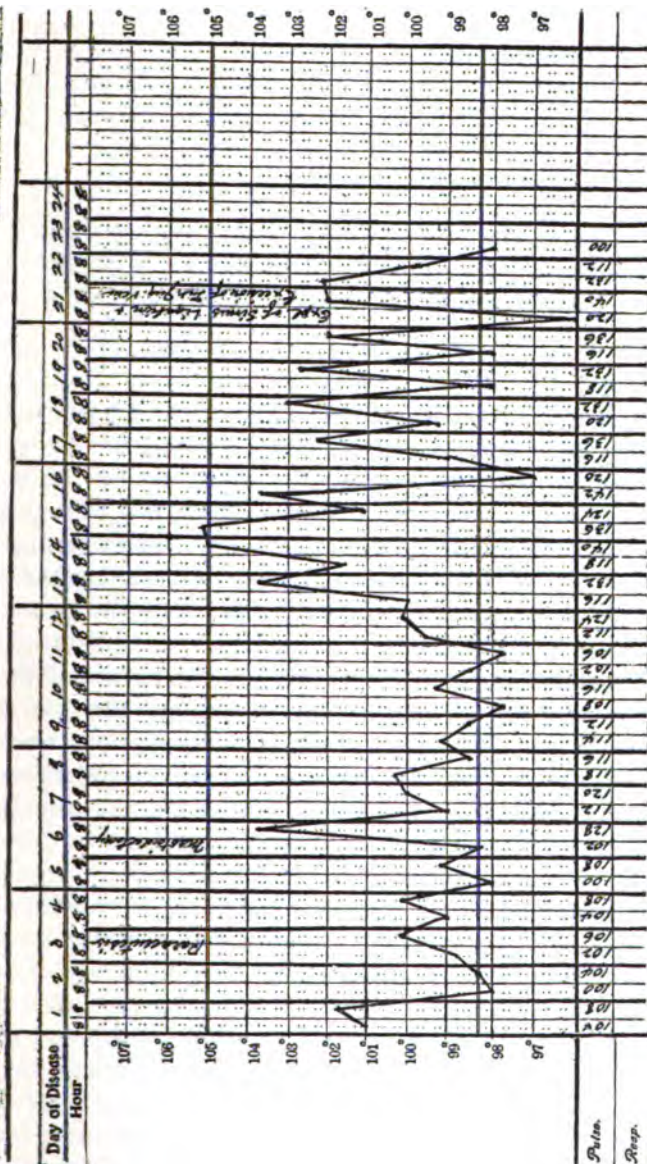
case that there were no chills, no nausea or vomiting throughout the entire course and development of the disease. Only twice did the patient complain of a chilly sensation, and this would have passed unnoticed had not the family physician been present and asked why a blanket had been placed over the patient, and was told by the nurse that the window at the far end of the room, which had been opened, had remained so for about an hour, and at this time the patient said she felt as though she ought to have more covering, and later, when questioned upon this point, she said she had a little creepy sensation, as though she were going to feel cold, but no chill was present.

A word as to the first case reported. As subsequent events proved, it would have been much the safer and wiser procedure to have ligated and resected the vein at the time that the sinus was operated upon, but my reason for not doing so was that in a number of other cases, and particularly those in children, where a good return flow was present, the vein was not molested and the patients made good recoveries. It is a well-known fact, however, that even though the vein in the neck contains a thrombus, we may have very free hemorrhage at the bulb, when not even a drop of the fluid can be attributed as coming from the vein. Probably in the future I shall feel more like ligating the vein in every case of sinus involvement, provided the condition of the patient will admit of it at the time of operation.

Name Mrs. C

Chauvin

Admitted Feb 1905



Dr. McKernon's Case of Sinus Thrombosis.

ON THE DISADVANTAGES OF THE DRY-GAUZE
DRESSING AFTER THE OPERATION FOR SEPTIC
THROMBOSIS OF THE LATERAL SINUS.

By H. GIFFORD, OMAHA, NEB.

ONE of the most striking examples of a bad use for a good thing is the dry-gauze dressing for the cavity left by an operation for septic thrombosis of the lateral sinus. Such an operation generally leaves one or two openings discharging a foetid pus laden with virulent germs from the portions of the sinus not fully exposed ; and as the inner wall of this tube is the only barrier between the germs and the intradural cavity, and as a large proportion of the deaths from the sinus thrombosis are the results of meningitis caused by the germs passing through this barrier, it would seem as if nothing could be more obvious than the necessity for giving the freest possible vent to the pus which continues, for a time, to be formed within the unexposed portions of the sinus. But instead of doing this, the great majority of operators seem to think that they are neglecting their duty unless they close these openings as thoroughly as possible with dry gauze, a material which, if the liquid in question were simply water, would certainly afford drainage by capillary attraction, but which, in the case of a thick albumen-laden liquid like pus, acts chiefly as a plug to keep it from escaping. In this respect the dry-gauze dressing for a septic cavity, the ends of which cannot be reached, always reminds me of the practice of the barber-surgeons of the last century, who plugged their wounds tightly with oakum and measured their achievement by the height to which the pus spurted when the plugs were removed. As an

example of what I mean, let me quote a report of Grunert from the clinic of Schwartze.¹ In the description of a desperate case of operated sinus thrombosis, the remarks on the operation close as follows: "Introduction of strips of iodoform gauze into both ends of the sinus; tamponade of the wound cavity." Then in the further notes on the course of the case: "29th of May, dressing changed, only the tampon from the lower sinus end removed; no hemorrhage; discolored foetid pus flows pulsating from the sinus. May 31st, at the change of dressing, a large amount of ichorous pus pulsates out of the lower sinus end. June 1st, at the change of dressing, ichorous pus again washed out of the sinus. June 4th, at the removal of the tampon from the upper sinus end, ichor still wells out."

And Alexander,² in describing a case in which he employed what I consider his otherwise excellent method of treating the peripheral end of the ligated jugular, says: "Into the vein a strip of gauze is pushed for about 3cm, etc. Change of dressing every other day at which the strip of gauze in the peripheral end of the vein appears soaked with pus, and upon withdrawing it some drops more of thick yellow non-foetid pus mixed with gas-bubbles welled forth from the vein."

These examples from the two most famous otological clinics of the world may, I think, be taken as fairly representative of modern practice on this point, but how any modern surgeon can believe that recovery from a septic phlebitis can be favored by plugging the end of the vessel with gauze, is more than I can understand. I suppose the practice originated with the idea that the gauze acts as a drain, which, as before mentioned, it does not. The most that any gauze does, when introduced through an opening into a suppurating cavity which it does not completely fill, is to prevent the opening from closing, so that when the dressing is changed it forms an easy guide to the original cavity and allows the latter to be cleansed of any pus which may have collected in the interim, and for this purpose it

¹ *Arch. für Ohrenheilkunde*, lix., p. 184.

² *Monatsschrift für Augenheilkunde*, Jan., 1904, p. 24.

does useful work, which is, however, done better in the great majority of cases by a drainage tube. But the walls of a thrombosed sinus are so thick and stiff that they themselves form drainage tubes of great efficiency if we simply avoid plugging them. But it is not enough to refrain from pushing gauze into the sinus-ends. Dry gauze, in my estimation, should not be used at all over that portion of the operation wound in which the ends of the sinus lie; for either the gauze is packed in so tight that it occludes the sinus-ends as thoroughly as if it were actually pushed into them; or the pus from the sinus spreads out between the gauze and the walls of the cavity so that the latter, which at the close of the operation is a very decent-looking place, is, when the dressing is removed, foul-smelling and foul-looking. I was led to seek a more rational form of dressing by a case in which the condition just described occurred. A young man with a chronic otorrhœa developed a sinus thrombosis, and on operating I found the vein filled with very foul-smelling pus. In completing the operation, quite an area of dura was exposed, and the wound was packed with iodoform gauze. On dressing it the next day, the discharge from the lower end of the sinus was found to have infected nearly all of the wound cavity. Under these conditions it seemed so absurd to continue the dry-gauze packing that I treated the wound almost as an open one—that is, I had it syringed out with peroxide and filled with boracic-acid powder and had the nurse repeat this procedure every two or three hours for the next two days. Beside which I myself two or three times a day injected several dropperfuls of peroxide solution into the lower end of the sinus. The walls of the cavity soon assumed a healthy aspect and the discharge from the sinus decreased so that after a few days the wound was packed loosely with iodoform gauze, which was then wet thoroughly with a sublimate solution 1:1000 and kept wet by covering the exterior with guttapercha tissue. This dressing was changed twice a day as long as there was any discharge from the sinus. The symptoms improved rapidly for a week or so, when an abscess of the right lung developed which had to be opened below the scapula, after which he

made an uninterrupted recovery. In another case of acute thrombosis of the sinus, the middle portion being found filled with pus, with no fœtor nor other complications, the temperature at once went almost to normal and stayed there under the wet-gauze dressing for two days after the operation, when I foolishly dusted in aristol freely before putting in the gauze, forgetful of the insoluble nature of this powder. The temperature promptly went to nearly 104° F., going down gradually under the simple moist dressing without the powder, so that the patient was practically well at the end of two weeks.

Cases of sinus thrombosis are not common enough in this vicinity to permit me to attempt anything like a statistical proof of the value of a moist dressing. I have used it in only five cases, in three of which the patient recovered. But it seems to me clear on general principles that a dressing of wet gauze, loosely packed into the cavity and kept wet by a guttapercha covering, will insure better drainage than dry gauze, to say nothing of the folly of plugging the sinus-ends. It may be asked, Why not put a drainage tube into one or both ends of the sinus? This I have considered, but the only object of such a tube would be to prevent the collapse of the sinus walls, which, in my experience, have always been so thickened as to allow no fear of this accident, and the introduction of a drainage tube would simply reduce the opening through which the pus must escape. It is, moreover, conceivable that the pressure of a drainage tube might favor necrosis of the inner wall of the sinus, with a spread of the infection to the meninges.

Whether packing the wound with boric-acid powder, as recommended particularly by Eemann,¹ may not be preferable to packing with gauze wet with sublimate solution, I am not prepared to say; my impression is that where the cavity can be cleaned more than once a day the boric powder is the better, but if the dressing is to be left twenty-four hours I believe the wet gauze gives better results.

Another point upon which I think great stress should be

¹ *Zeitschrift f. Ohrenheilk.*, xlv., p. 405.

laid is the importance of frequent dressing, as long as there is any question of pus still being produced in the lumen of the sinus. If the reader will revert to the citations previously made from Grunert and Alexander, he must, I think, admit that a patient under such conditions cannot have the same chance of recovery as he would if the dressing were changed from two to four times a day, and the sinus (and jugular vein if the latter is infected) thoroughly syringed out with peroxide of hydrogen. Such a plan, of course, involves additional trouble, but in these cases where the patient's life hangs in the balance we certainly ought not to neglect so obvious an advantage.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

STATED MEETING MARCH 9, 1905. DR. GRUENING IN THE CHAIR.

Demonstration of charts for teaching otology to undergraduates. By F. WHITING, M.D.

Dr. GRUENING asked how these charts were drawn. They were certainly the work of an artist, but one must know all these things to bring the characteristic conditions so thoroughly before the eye. It was hardly possible for any one that was not an otologist to have such knowledge. He was inclined to think that Dr. Whiting had drawn them himself.

Dr. WHITING disclaimed this credit, but said that he had spent a great many hours by the side of the artist telling him what to draw. The man had no knowledge at all of the subject.

Dr. MCAULIFFE presented a young girl who had undergone a **double radical operation**. The ears showed degenerative changes, although the surgical indications had been met. The loss of hearing in so young a person was quite a serious matter. The girl had had five operations performed by different men, and up to November, 1904, the time when this history was taken, her hearing was fairly good. She then began to complain of tinnitus, which increased and diminished her hearing. The question now was, What could be done to improve her hearing and remove the tinnitus? She had suffered from this tinnitus since the radical operation was performed, and it is now becoming so great as to render her stupid and disturb her sleep.

The right ear first began to discharge at two years of age and was treated conservatively, up to the operation in 1903. After the operation there was no further discharge and the hearing was fairly good. It began to discharge again in February, and

she complained of fainting spells and dizziness. A second operation was done in February, and a third in April. Since then she has been free from the discharge until six weeks ago, when she began to feel as if her ear were packed with some foreign body, and her hearing decreased. The left ear also discharged pus and was operated upon first in September, 1903. This was not successful, and a second operation was undertaken shortly afterward. This operation proved successful, but the symptoms began at the same time as in the other ear—a feeling of fulness and increased pressure. The results of the operation were very interesting, since, owing to the permeability of the Eustachian orifice, a new drum cavity had been formed, as is usually the case. In the right ear he did not know what kind of meatal flap had been made; there was no skin graft. In the left ear he imagined that Dr. Whiting's graft had been made, since the cosmetic effect was the same and skin grafts were made. The question that remained was whether the increasing excess of contracting fibrous tissue was responsible for the tinnitus and loss of hearing. He thought that the case gave some color to the theory promulgated by Dr. Bates, who removed the fibrous tissue of O. M. C. C. ears in order to get as thin a septum as possible between internal ear and sound.

Is there anything in otology to relieve the girl? This is a very important question for her, as she has a promise of long life before her with the present prospect of an increasing aural disability.

Dr. GRUENING said that he heard for the first time of Dr. Whiting's flap and Dr. Bates's theory, and that probably the Section also would like to have some explanation of these references.

Dr. MCAULIFFE said that he thought that Dr. Whiting himself could give the best description of the flap devised by him.

Dr. WHITING said that he could honestly claim the distinction of having instituted a new flap, though he had never written the matter up for publication, and was not enough of a draughtsman to show how it was made, but was having a representation made by a draughtsman, which would show it accurately. He could only say that he transfixed the auricle in the vertical meridian above, passing around the posterior segment of the meatus with a semicircular sweep, which terminates in the vertical meridian below, but does not enter the concha at all. After the horizon-

tal incision was made, he made an incision of the vertical meridian below, and turned up exactly half of the fibro-cartilaginous meatus. This made an ample flap, and, so far as he was able to mould the flaps in the radical operation, he found it to cover a larger area of denuded bone, remain in position better, and was more easily handled. He did not feel that he could describe it more accurately than that.

Dr. GRUENING said that, although the description of the flap was very clear, he did not feel that he would be able to make it, and did not think he would ask for Dr. Bates's theory this time.

Dr. L. M. HURD: Report of a case of primary tuberculosis of the middle ear.

J. G., male, æt. seventeen months. When six and a half months old, the mother observed that the baby cried one night when laid upon the right side; she then noticed a swelling over the mastoid. The next day the baby was brought to the Manhattan Eye and Ear Hospital, where the mastoid was opened. This was the first week in August. The resulting wound failed to heal, and later the discharge became very offensive. The case came under my care the last of September, when dead bone could be felt at the bottom of the mastoid wound. I operated, and found the bone necrotic in every direction from the old bony wound leading into the antrum, also that a greater portion of the posterior-superior wall had necrosed away. The malleus, which was necrotic, was examined. The pathologist reported as follows: "Sections show marked absorption of the bone salts by osteoclasts, enlarging the Howship's lacunæ; also considerable activity of the osteoblasts. The granulation tissue is the seat of many areas of coagulation necrosis with epithelioid cells and giant cells. The giant cells are also to be found in the bony tissue, where the salts have been absorbed. Diagnosis: Tuberculosis of the malleus."

The mastoid remained open three months, and the granulations in the cavity showed a great tendency to bleed. February 3d, I removed some granulations from the roof of the cavity, and submitted them to the pathologist, who stated that it was typical tuberculous granulation tissue.

One month ago the left ear began to discharge, and now there are pale granulations in the middle ear similar in character to those in the other ear. Smears from both ears have been made several times with negative results.

The father is tubercular and is very fond of the baby, and probably has infected the case by kissing. The mother is in good health.

There is a history of the baby having had a slight cough, but I cannot find any evidences of tuberculosis in the lungs or elsewhere.

Dr. J. F. McKERNON: Exhibition of gland removed from surface of mastoid, simulating mastoiditis.

Dr. McKERNON said that the symptoms which presented themselves previous to the removal of this gland were somewhat similar from the standpoint of pain to those in mastoiditis. The patient, a young lady, was nineteen years old, and a year ago last month he had operated on the left side for acute mastoid involvement. The usual healing took place, and the girl left the city in September to attend school in Montreal. On the 9th of October she complained of severe pain on the opposite side, and they were afraid she had contracted trouble in the other mastoid, and sent her back to New York. On examination, he found that the canal and middle ear were in a practically normal state, there was no congestion of the drum membrane or canal, and no swelling back of the mastoid. On asking where the pain was, the girl put her finger on a spot midway between the tip and mastoid antrum. The tissue was a little softer there than at other portions, and pressure caused her exquisite pain, making her cry out. The other portion of the mastoid surface showed no disturbance. Thinking that it was probably a gland which might have become enlarged from a cold, or from an infection of the throat, the place was painted with iodine, and the girl told that it would probably diminish in size and give her little trouble. At that time there was a barely perceptible enlargement. The girl was kept under observation for ten days, and during that time the gland increased very little in size, but the patient complained of much pain, and could not rest night or day, so that the physician in attendance administered morphine hypodermically, in order to relieve her. The speaker saw her several times, and the physical signs in the middle ear were all normal, but finally, as a matter of expediency, he advised cutting down upon the gland and removing it, although he did not know then that it was a gland, as there was no outline, but simply an indefinite mass. The girl was put under chloroform, and after the soft tissues were incised this gland was reached. The specimen pre-

sented was only about one-third of the original mass, as a double cross-section had been made from it. The gland was embedded in the periosteum and overlapped the field corresponding to the antrum; incorporated in this gland, were the posterior auricular and the auricularis magnus nerves. The nerves were dissected from the gland and the latter removed, the incision was sutured, and the girl had no more pain. The pathologist reported that it was pure gland tissue.

The speaker said that he reported the case on account of its extreme rarity in simulating a certain form of mastoid trouble. None of the usual physical signs was present, but there were a somewhat enlarged mass and excruciating pain which made it necessary that something should be done to relieve the patient. There was no doubt of the suffering. The patient was carefully observed, and was not at all neurotic.

Dr. HASKIN presented a patient suffering from **deafness following meningitis**. This patient had come to the clinic with a history of deafness following an attack of meningitis two years before. This deafness existed in both ears. There was no history of otorrhœa, but there was marked destruction of both ear drums, a large opening into the attic of the left ear, and evident symptoms of inflammation in the middle ears. The child is four years old and absolutely deaf. They attribute the deafness to the attack of meningitis. The speaker said he did not know how to account for the condition, but that it looked like ignorance on the part of the parents in not noticing the discharge when it may have existed.

Dr. PHILLIPS said that he thought the case illustrated a class which is frequently seen in hospital and dispensary practice, where even the parents disclaimed all history of discharge, and yet examination of the ear would show that the drum was partially or wholly destroyed by previous suppurations—showing either forgetfulness or carelessness on the part of the parents. In the case presented by Dr. Haskins, there was a distinct history of cerebro-spinal meningitis, and there is no doubt that the child did have it, but the destruction of the membrane no doubt dates from some previous attack of suppuration and is not associated with the meningitis. As to these cases of deafness following meningitis, the speaker said that he had seen an unusually large number of such cases this season. He had never before seen so many—a few of them partially deaf, many entirely so. He

expected later to show a few cases where there had been a decided improvement following treatment. Most of them, however, were totally deaf and remained so. He also told of a case of a very intelligent child and attendant who had come to the Post-Graduate Clinic, giving a history of deafness following an attack of meningitis. The attendant said that the child had heard perfectly well for two months after the attack, and then became totally deaf.

Dr. BRANDEGEE presented a small **emergency pocket case** which he had devised, containing two curettes, aural specula, applicators, angular forceps, six knives with an adjustable common handle, and a metal pocket for cotton. The case and contents could be readily sterilized in a formalin stove.

Dr. J. E. SHEPPARD: **An obscure case of deafness.**

Miss M., æt. thirty-five, had what seemed like a mild influenza, during which there developed, on March 18, 1904 (Friday), a stuffy sensation and slight pain in A. D. By 4 A.M. on the morning of Saturday, March 19th, the pain was intense. She was then seen by Dr. Durkee, who reports to me that the membrana tympani at this time was only moderately inflamed, pinkish in color, this color remaining, with but little change, throughout the day. The pain was much relieved by frequent hot douching, so that it could be called moderate. During the day, no elevation of temperature, no perceptible deafness, no dizziness, no vomiting.

Sunday, March 20th, about 3 A.M., began, after a brief period of nausea, violent vomiting, and this continued, in spite of every effort at relief, for about twelve hours. At the time vomiting began, there was some elevation of temperature (to about 102° F.), and the pain in the ear was quite severe. About 7 A.M., while the Doctor was holding the patient's head, a few drops of fluid were felt trickling from the ear, and at this time the first deafness was noted. After twelve hours of this violent vomiting, there was great exhaustion of the patient, and the temperature was down to about 96°. Monday, March 21st: In the early part of the day, she had three "fainty" attacks, lasting some minutes, distinguished by great pallor of face, unconsciousness, and extremely weak pulse. After these attacks, the patient commenced to complain of a distressing tinnitus in both ears, which, by the way, has never ceased from that time to the present. No further vomiting; slight dizziness (not much more than lightheadedness), followed by syncopal attacks.

For the first time she, this morning, complained of pain in the left ear, and both ears became deaf. (Deafness had been considerable in A. D. during Sunday, was much less early Monday, and became complete in both at the time of the "fainty" attacks.)

For the history up to this point I am indebted to my friend, Dr. Durkee, who was a friend of the family and who was in almost constant attendance upon the patient from the beginning of the illness. At this time, and especially because of the beginning involvement of the second ear, I was called in. Deafness to the watch, voice, and tuning-forks seemed complete. She complained of a very distressing, constant roaring in both ears. Considerable pain in A. S., none in A. D., which was discharging a moderate amount of sero-pus. In right *Mt*, a small (pin-hole) anterior-inferior perforation. Left *Mt* much reddened, posterior half moderately bulged. This was immediately incised. Scarcely appreciable tenderness at both mastoid apices. During the next three days (up to March 24th) there was free discharge from both ears, no further pain, deafness complete, tinnitus most distressing (not pulsating), dizziness not marked. Treatment had consisted of hot douching, gentle inflation, adrenalin spray, ice-bag for about twelve to eighteen hours to each mastoid, AgNO₃ sol. to vault; rest in bed, light diet. Began to-day with pilocarpin muriat gr. $\frac{1}{16}$ every three hours by mouth. March 25th: Mastoid tenderness gone; tinnitus possibly a little less. Seems to-day to hear by B. C. the C fork (128 d. v.), but not other forks, nor the voice. To-day I found a second pin-point perforation in right *Mt*, not far from the original opening. To continue hot douche, adrenalin spray, and pilocarpin. From March 29th to April 6th gave pilocarpin hypodermatically, getting marked constitutional symptoms from 8/60ths of a grain. Has been having two or three furuncles in the ext. aud. canals, which, on account of the severe pain, seem to have left her pretty well exhausted, so the pilocarpin was temporarily stopped. Seen by Dr. Gorham Bacon in consultation. April 8th: The two small anterior-inferior perforations in right *Mt* are closed, and there is now a small perforation in the posterior half of *Mt*. April 11th: To-day has the first relief from the succession of boils in both ears. She now hears by B. C. the C, C', and C' forks, and possibly the C' ' from the teeth. Having taken nux vomica in the meantime, on April 14th hypodermatic use of

pilocarpin was renewed. April 30th: Dose has been gradually increased up to $10\frac{1}{2}$ /60ths daily, the physiological effect being secured after each injection. Seems to hear the tuning-forks more distinctly, and through the conversation tube can hear a low-pitched voice sufficiently to indicate, after the speaker, rising and falling inflections, but cannot distinguish words. May 21st: Is now taking pilocarpin up to $11\frac{1}{2}$ /60ths. Perforations in *Mt* are entirely closed. Hearing no better. Has been taking, in addition to pilocarpin, the phosphate of strychnia $\frac{1}{16}$ gr., t. i. d. Seen by neurologist, Dr. Browning, who says there is no trouble outside of the ears. He recommended blisters over the mastoid bones, and, instead of strychnia, compound sol. of iodine internally, in five-drop doses, the pilocarpin to be continued as before, and to try mild X-ray and high-frequency current. May 26th: There being now but little reason to anticipate any further benefit from the pilocarpin, it was stopped, and the comp. sol. of iodine increased to six drops. June 13th: The appearance of the membranes and the use of the catheter show scarcely any remaining middle-ear trouble. Hearing unchanged. Is now taking eight drops of comp. sol. of iodine, t. i. d. June 28th: Is going away for the summer. Recommended that she take regularly K. I., commencing with gr. v., t. i. d., and each week to increase the individual dose one grain.

October 15th: Virtually no change in the local condition. Marked gain in general health. Hearing the same. Recommended that she take K. I. gr v., t. i. d., over a long period. Walking is not yet very steady, there being some staggering. This showed itself very much when she first began moving around after her original illness, and seems to have gradually improved. Tinnitus remained unchanged. I have not seen the patient since that date (October 15th), but I am told by members of the family that the deafness and tinnitus appear absolutely unchanged. Her gait is much improved. She has put on much flesh. Her habit as to eating has entirely changed, in that before her illness she was typically a small and dainty eater, whereas now she is almost a glutton—seeming to think much of the time only about what she is to have to eat, and having at all times an enormous appetite. I believe she has been latterly under the care of Dr. Weed, of New York, who expected to be present, but is detained at the last moment. He informs me that the recent treatment has consisted of inflation, and iodide

of potassium in large doses, 70 grains, t. i. d., but there seems to have been absolutely no improvement in hearing, nor lessening of tinnitus. Gait is now very good. In the early summer, I recommended as worthy of trial lumbar puncture, on the basis of Babinski's report, but, since I was without experience with the treatment, the patient and family were unwilling to make the experiment. I hope if any of the gentlemen present have had experience with this treatment, good or bad, that they will give us the benefit of it. What is the diagnosis? Frankly, I do not know what has happened. Even the nature of the middle-ear trouble is perhaps doubtful. In the presence of seemingly good drainage, why should a second, and finally a third, perforation have occurred in the right *Mt.* It seems as if tubercular and diphtheritic middle-ear disease can be positively excluded. As to the symptoms referable to the internal ear: Can they be hysterical? It seems to me, certainly not.

Is it possible to have a double neuritis acoustica? Alt has described a unilateral case, due to influenza, where on the second day of the disease occurred a facial paralysis, on the third day tinnitus, great dizziness, and deafness on the same side; eye-ground normal.

Would the symptoms be explainable by the supposition of a hemorrhage into the fourth ventricle? Sugar offers this as an explanation of a unilateral influenza case, with sudden deafness, great dizziness, and pain in temporal region, but inclines toward the belief that there was a hemorrhage into the labyrinth. A simultaneous bilateral labyrinthine hemorrhage is almost inconceivable. A suppurative labyrinthitis, in view of the subsequent course of this case, seems out of the question. A simultaneous bilateral serous effusion into the labyrinths seems to be more probable, but in that case why should treatment not have had more effect?

It was with the feeling that this offers the most plausible explanation that I suggested lumbar puncture, and I hope for a helpful expression of opinion on the subject from the gentlemen present.

Dr. MCKERNON inquired whether the middle-ear changes when first seen were confined to the attic. Dr. SHEPPARD replied that they were not.

Dr. WHITING inquired whether a culture had been made of the discharge from the ear, and on receiving a reply in the negative,

said that the case was an exceedingly interesting one, and that he regretted very much that no culture had been made, not that it would have thrown so much light on the nature of the inflammatory process, but it might have helped to an intelligent opinion. He had seen one case—perhaps two—which displayed many of the manifestations described in this one. One of these cases was what he had been accustomed to call a double apoplexy of the labyrinth—a double Ménière's disease. This displayed certain of the manifestations described, but others were absent. This man claimed that he had never had any trouble with his ear in his life, but one day while walking in Central Park he was suddenly seized with vertigo and a tremendous roaring in his ears. He fell over in the walk in a semi-stuporous condition, but did not entirely lose consciousness. He still knew where he was, but everything seemed to whirl around him. He was taken up in an ambulance and carried to a hospital where he remained for three weeks. During that time the vertigo slightly diminished, but he said that for a week he could not open his eyes for the vertigo was so terrific that it induced vomiting. It was two weeks before he could get out of bed, and five or six weeks before he could walk with any steadiness. The speaker had seen him two or three months after the attack, and co-ordination was then fairly re-established, but he could not stand very well on two feet, and with one foot raised could not stand at all. While this case lacked many of the features mentioned by Dr. Sheppard, it seemed to be sufficiently analogous to be mentioned in connection with it. He had always regarded it as a case of double apoplexy of the labyrinth. In Dr. Sheppard's case there must have been a serous effusion on both sides.

Dr. LEDERMAN inquired whether the vomiting was of a projectile nature.

Dr. SHEPPARD replied that he did not see the vomiting, but from the description given it could not have been typically projectile. His own opinion, however, had always been that it was a cerebral vomiting.

Dr. LEDERMAN told of a case which, while traumatic in origin, presented some interesting symptoms in this connection. In this instance after an incision had been made into a drum acutely inflamed, projectile vomiting set in, which was attributed to striking the posterior wall of the middle ear at the time of the incision. Nausea kept up for two or three days and the man could

not get on his feet for two or three days, on account of vertigo which accompanied the attack. The vertigo lasted for a week. During these symptoms the hearing was much lowered but gradually returned. The patient had to remain in bed to avoid bringing on the attack of vomiting. As these symptoms had not existed previous to the surgical treatment, there was evidently a destruction of the labyrinthine equilibrium due to this treatment. The vomiting was typically projectile, extending as far as two feet.

Dr. GRUENING referred to the fact that Dr. Sheppard had asked if any of the gentlemen had ever had any experience with lumbar puncture in similar cases, and then told of a little boy upon whom he had operated for abscess of the temporo-sphenoidal lobe. The abscess closed and the boy recovered. Four years later the boy suddenly began to vomit, and from this ear serous fluid began to flow in large quantities. Examination showed that the lower surface of the brain from which this fluid came had opened, but there was no granulation tissue. A gauze drain was put into the ear, and the ear was kept sterile. The boy became very ill, however, and finally lumbar puncture was made and a one-per-cent. solution of lysol was injected, and the boy recovered. There was no discharge of serum after the puncture. Two punctures were made, and more than thirty cubic centimetres of fluid were drawn off. This case was reported by Dr. Manges. In this case there was a superabundance of cerebro-spinal fluid which absolutely came through the ear, and the patient was benefited by the puncture.

Dr. LEDERMAN asked whether the hearing was improved by the lumbar puncture.

Dr. GRUENING replied that the hearing had been destroyed. The ossicles had been removed and the abscess had been opened after the removal of the antral roof and the tegmen tympani, so that there was practically no hearing.

Dr. H. A. ALDERTON: A few remarks on the proper cleansing of a running ear.

Dr. ALDERTON emphasized the importance of greater personal supervision on the part of the attending surgeon; also the need of rendering the external ear perfectly aseptic before doing a paracentesis of the drum membrane. He recommended that an attempt be made in all appropriate cases, after the paracentesis, to install the dry method of treatment by means of frequent use

of the gauze drain and outside dressings, with the hope of shortening the course of the disease. Should this prove inefficient after a trial of forty-eight hours, he recommended syringing every two hours with a warm antiseptic solution, by means of a soft-rubber constant-flow syringe. There exist then but three indications: first, the removal of the accumulating discharge from the ear canal; second, the rendering of the canal as little septic as possible; third, the administration of systemic remedies with a view to modifying the intensity of the middle-ear inflammation. The necessity of thorough drying of the external ear after each douching, was insisted on. He cautioned against the use of peroxide of hydrogen in acute cases. He then took up the methods of cleansing an ear the seat of a chronic abscess, emphasizing the necessity for providing good drainage of the tympanum by enlarging the perforation down to the floor.

He emphasized the disadvantages of keeping up the moist treatment too long; as syringing has the well-known disadvantage of encouraging an oedematous condition of the mucous membrane, the development of granulation tissue, an osmotic flow from the blood-vessels, and an increase in the secretion from the glandular apparatus.

Dr. GRUENING said that there were a number of interesting points brought out in this paper, and that he certainly agreed with Dr. Alderton that the dry method of treatment was to be preferred, but that in some instances it was impracticable. It was often impossible for the surgeon to be in sufficiently close attendance. The nurse could not carry the gauze to the drum, and very often the general physician could not do it. He had treated a number of patients in his office where a daily introduction of gauze proved sufficient, and very often in three or four days the patients were cured. In general it was rather difficult to introduce the middle-ear syringe and wash out the ear of a child, and then carry the gauze to the drum. These manipulations are difficult in the child. He believed, however, in the dry treatment, and the plan of drainage was sound and very satisfactory.

Dr. ALDERTON said that much of the result depended upon the attending surgeon himself, but that if a competent nurse were provided with the proper material and carefully instructed how to follow up the treatment, it could be as thoroughly carried out in a private family as by the surgeon himself.

Dr. C. G. COAKLEY: Condensed report of a case of streptococcic otitis media, followed by mastoiditis. Operation. General septicæmia. Death.

Dr. WHITING said that the question of the path of infection was an exceedingly interesting one. The writer had spoken of the wounding of the emissary vein, and of the possibility of the infection of the sinus in that way. He himself had been so unfortunate as to do this in an operation some time ago and had a sinus thrombosis. In this case, however, the patient fortunately recovered; but the subsequent exploration (of Dr. Coakley's case) showed no sinus trouble, and therefore the path of the infection is almost confined to lymphatic absorption, and the fact that no large lymph nodes were found should not invalidate the proposition. Where you cannot trace a path through the inner table of the skull, and no sinus thrombosis is present, it seems a fair proposition that it is lymphatic absorption.

Dr. ARNOLD KNAPP said that the possibility of infection through the jugular bulb should be considered. The condition of the sinus found at operation did not exclude a parietal thrombosis of the jugular bulb. After operation, discharge from the auditory canal continued for some time, and in the light of other cases, where no change in the lateral sinus was found to account for the septicæmia, it seems feasible to assume a direct infection of the jugular bulb which was not followed by an obturating thrombus.

Dr LEWIS said that the case was an extremely interesting one. In a review of the case the only criticism that he would make was that, in view of the fact that the infection was due to the streptococcus, he regretted that he had not supported Dr. Coakley in his inclination to open the mastoid cells three days earlier than was done. Dr. Lewis was not present at the operation, but saw the case some forty-eight hours later. The mastoid operation had been most thoroughly performed, the wound was clean, and the external auditory canal dry; the discharge from the middle ear, which Dr. Coakley stated had been profuse for a few days, had ceased.

They were positive that an unrecognized complication was present; but where? A high temperature and an increase in the pulse and respiration did not give any clue in the absence of localizing symptoms. Naturally the brain, the sigmoid sinus, and the jugular vein were considered the most probable seats of

a further infection, but only because the ear was the organ primarily infected, for there were absolutely no local symptoms present to cause this suspicion. The sinus was opened later, purely as an explorative procedure, and, as far as the unaided eye could detect, no infection was present.

A microscopical examination of an exsected jugular vein would have been necessary to determine the question of whether or not this was the path of infection. Dr. Lewis seriously questions if they had any justification, under the circumstances, to take such a radical step.

MEETING OF APRIL 13, 1905. DR. EMIL GRUENING, CHAIRMAN.

Dr. PERCY FRIDENBERG presented a young woman with a **bilateral deformed auricle**. The upper part of the cartilaginous auricle was invaginated under a fold of skin.

Dr. GRUENING presented a patient upon whom he had **successfully operated for a brain abscess** in the temporo-sphenoidal lobe. The patient, a man twenty-seven years of age, was seen on December 21, 1904, suffering from chronic otorrhœa and cholesteatoma. He complained of headache. T. 101°; P. 60. No paralyses; no optic neuritis, and no other symptoms except optic aphasia. On showing him a watch and a key he perfectly well understood their use but was unable to mention their names. The operation was performed on the same day and the tegmen of the tympanum and the antrum were found defective. The dura bulged and was discolored. The exposure was enlarged into the region of healthy dura; the temporal ridge and part of the squama were removed. An incision through the dura revealed normal brain tissue. At a depth of *2 cm* a large amount of fetid pus was evacuated. The incision was separated and the discharge allowed to escape. The cavity was irrigated. Iodoform gauze was gently introduced. During the next five days there was considerable discharge found in the gauze and about the dressings, then the wound became dry. The brain in this area prolapsed; it subsequently organized, and became firm and retracted. The aphasia existed for three weeks. At present the wound has entirely healed. The hernia is not visible as it took place into the mastoid wound. Since 1901, Dr. Gruening has operated on four abscesses in the brain successfully. He has followed this method in all cases.

Discussion.—Dr. MCKERNON agrees with the speaker that drainage was the important factor in the treatment of these cases, and, whenever it is possible, to treat the abscess cavity from its lowest point. The after-treatment was thus very much simplified.

Dr. EAGLETON inquired how the prolapsed brain was treated.

Dr. GRUENING replied that the prolapse was not treated at all, it apparently took care of itself. He was in favor, whenever possible, of attacking the brain abscess from its lowest part. He had attempted to make use of Dr. Whiting's encephaloscope but without success.

Dr. G. B. MCAULIFFE presented a patient with **ossification of the auricles**. The patient had been in a psychopathic institution ten years ago and his ears had been injured a number of times. In attempting to correct the resulting deformity, the Doctor was enabled to confirm the bony nature of the auricle, which had been apparent on palpation.

He also reported on a case of **external cerebrotomy** in a patient who suffered from caries of the attic and antrum and presented some labyrinthine symptoms. An investigation of the brain proved negative and the patient recovered.

Report of two cases of mastoidectomy, sinus thrombosis, ligation and resection of jugular vein. Recovery. By Dr. J. F. MCKERNON (published in full, pp. 298-303).

Discussion.—Dr. HARRIS: As regards the question of closing the neck wound after resection of the jugular vein, he had recently observed a case in which the neck wound had been closed. An abscess developed, which extended downwards and led to an abscess of the mediastinum which terminated fatally.

Dr. ARNOLD KNAPP thought that the second case was unusually instructive, as showing that general opinions on septicæmia do not hold in all cases of mastoid infection. It is now assumed that sepsis from an otitic condition is always due to a sinus involvement. All cases have not such a fortunate termination as the second one which Dr. McKernon reported, if the operation is delayed.

Report of a case of mastoiditis complicated by pneumonia, gangrene of the lung, endo- and peri-carditis, without apparent involvement of the lateral sinus. By S. McCULLAGH, M.D.

Child, age five, had acute mastoiditis supervening on chronic

suppurative otitis media. Operation showed mastoid to be full of pus, cholesteatomatous material, and granulation tissue, with sinus and dura exposed. Four sequestra were also removed. Patient reacted well from the operation. Five days later, pneumonia developed in left lung with signs of pleurisy in the right. Two days later, pericarditis developed and endocarditis was suspected. Four days later, the patient died.

Autopsy showed lobular pneumonia, left lung. Right pleural cavity full of offensive fluid, with the lower portion of right lung collapsed and gangrenous. Pericardium distended by seropurulent fluid and surface covered with fibrinous deposit. Beginning involvement of endocardium. Lateral sinus contained no thrombus. Jugular bulb not examined. No bacteriological examination.

Preliminary report of a case presenting Ménière's symptoms for five years. Result to date of operation of ossiculectomy. By P. D. KERRISON, M.D.

Report of a case of an unusually thin lamella of bone separating the sigmoid sinus from the meatus. Successful radical operation. By W. SOHIER BRYANT, M.D.

The dangers of attempting to curette the jugular bulb prior to ligation of the jugular vein in operations upon the sigmoid sinus. By J. D. RICHARDS, M.D. (To be published in next number of these ARCHIVES.)

Discussion.—Dr. MCKERNON agreed entirely with what Dr. Richards had said about the impossibility of curetting the jugular bulb. If the terms are used as such, it simply means that they are too free and that it is impossible to curette the bulb. He also agreed with Dr. Richards on the importance of removing the walls of the vein as well as the contents. He does not always ligate the jugular vein, especially in children, where the clot in the sinus was solid and apparently recent and the patient's condition was good. A large proportion of the cases unquestionably get well without the ligation of the jugular vein.

Dr. GRUENING thought it was sometimes possible to extract a thrombus from below, where it was not necessary to ligate the jugular vein. At the same time hemorrhage from the bulb does not mean an involvement of the jugular vein, because only recently he had, after ligating the jugular vein, met with profuse hemorrhage from the bulb, which evidently came from the inferior petrosal sinus.

REPORT OF THE TRANSACTIONS OF THE
SEVENTH INTERNATIONAL OTOLOGICAL
CONGRESS IN BORDEAUX, AUGUST 1 TO 4,
1904.

BY DR. DREYFUSS, STRASSBURG.

Translated by Dr. ARNOLD KNAPP.

Two hundred aurists took part in the Congress. Of these, the majority, of course, were French; England and the United States came next; Germany was represented by five members, Austria by only two, and Switzerland by none.

In the late afternoon and evening of each day excursions and banquets were planned in a most hospitable manner.

The scientific part had been admirably arranged by the Secretary, Dr. Lermoyez. It is, however, becoming well recognized that the value of international congresses in furthering science is a very small one. In the author's estimation, this is due to the two following factors: first, the difference of languages spoken at a congress; and, secondly, the enormous quantity of papers. In addition to three long addresses, 119 papers were announced.

1. POLITZER (Vienna). **On the necessity of official instruction in otology in the medical faculties.**

A short resumé of the present conditions of instruction in the various countries. The author draws attention to the imperfection of the state examinations, and suggests a remedy in the interest of suffering humanity.

2. GRADENIGO (Turin). **On the necessity of the obligatory study of otology at the universities.**

After giving the general reasons, Gradenigo states the necessity of an obligatory examination in otology. He suggests the formation of an international commission, whose duty it shall be to introduce the subject to the various governments. The commission is selected.

3. YEARSLEY (London). **On the constancy and variation of the suprameatal spine.**

One thousand and seventeen skulls of various races were examined. In 155 cases no spine was present. More frequently its presence was scarcely suggested. In every case the practised eye detected the depression above the spine, and in the author's opinion this depression is of a great deal more practical importance than the spine.

4. BROECKAERT (Ghent). **On the injection of cold paraffin. Demonstration of a new syringe.**

5. TRÉTRÔP (Antwerp). **The practical use of bacteriology in diseases of the throat, nose, and ear.**

The author describes his antiseptic and aseptic practices.

6. DREYFUSS (Strassburg). **On the influence of quinine on the tonus labyrinth.**

(To appear as an original article in these ARCHIVES.)

7. JOERGEN MOELLER (Copenhagen). **Remarks on otosclerosis.**

A case with clinical and autopsy reports. The formation of spongy bone tissue in the labyrinth wall. On the right side, true ankylosis of the stapedial joint. On the left, however, preservation of the annular ligament.

8. SARGENT F. SNOW (Syracuse, N. Y.). **Catarrhal deafness; report on 400 cases.**

9. THEODORE HEIMANN (Warsaw). **Indications for operating on the mastoid process in acute otitis media.**

The mastoid process should be opened under the following conditions: when the suppuration continues after three to five weeks; when pain continues in the mastoid process and its neighborhood after three to four weeks, even though the otoscopic picture reveals no sign of retention; if the fever continues over three weeks. Swelling of the cutaneous covering of the mastoid process in the first days of the disease does not of itself indicate operation. Swellings occurring in the subsequent course are of more importance. Signs of general meningitis are not an absolute contra-indication.

10. DENCH (New York). **The radical operation in chronic purulent otitis.**

(Published in full in the preceding volume of these ARCHIVES.)

11. CASTEX (Paris). **Injuries of the ear from accidents. Report of 78 personally observed cases.**

12. MOURET (Montpellier). New investigations on the petrous cells.

This is a continuation of the investigations published in October, 1903, in the *Société Française de Laryng.*

He found that pneumatic cavities extended from the tympanum as a central point in the direction of the petrous pyramid and occipital bone, which he was able to divide into eight groups. Of these, the following are of practical importance: the cells situated in the upper meatal wall, those situated at the lower surface of the labyrinth, and those which extend into the occiput.

13. JACQUES (Nancy). Aural suppuration, with perforation into the retromaxillary fossa.

14. JACQUES and DURAND (Nancy). Demonstration of normal and pathological specimens.

These specimens were preserved in Kayserling's fluid, and mounted in celluloid.

15. VILLAR (Bordeaux). Technique of nerve suture of the facial with the accessory or hypoglossal nerves in cases of facial paralysis.

The author has performed suture of the facial and accessory nerves in one case.

16. MOLINIÉ (Marseille). Defect of the lips of the Eustachian tube and atresia of the pharyngeal tubal ostium.

Molinié has observed two cases. In both, the naso-pharyngeal isthmus was contracted. Both cases are, according to the author, presumably the results of too energetic galvano-caustic procedures.

17. G. LAURENS (Paris). Aural surgery in its relation to the vertebral column and the base of the skull.

The author has operated upon thirteen cases of vertebral or hypocranial otitic suppuration.

From a clinical and operative standpoint, the base of the skull is divided into three territories: (1) the posterior or occipital, (2) middle, corresponding to the lower surface of the petrous bone, and (3) anterior or lateral præ- or latero-vertebral.

Infection of these parts is probably due to direct contact, and, more rarely, by means of the blood or lymph-channels. As regards operation, the most important step is the total resection of the mastoid process. After this has been accomplished, three areas must be carefully investigated because suppuration may

extend from them: (1) the groove of insertion of the digastric muscle; (2) an area which is limited anteriorly by the posterior meatal wall, posteriorly by the S-formed sulcus and the lateral sinus, below by the mastoid apex, and above by the antrum; (3) the lateral sinus and the cerebellar dura. The remainder of the operation depends upon the conditions found present.

18. The selection of a simple and practical acoumetric formula. By POLITZER, GRADENIGO, and DELSAUX.

The formula recommended by the authors for measuring hearing and its notation is adapted for use in ordinary practice. If a more detailed examination be necessary, other methods should be selected according to the judgment of the examiner.

The address is divided into three chapters:

I. The various methods of examination of the normal and diseased ear are described.

II. An attempt is made to determine the most suitable method of examination for ordinary practice.

III. A scheme is suggested by which the results of the examination can be tabulated.

I. The Examination of the Hearing in the Normal and Diseased Ear.

The various methods which are employed at the present time to determine the acuity of the hearing have caused within the last years a number of valuable papers to be written by physiologists as well as by aural surgeons. The various tones which make up the human voice were noted and analyzed on the basis of modern physics. The laws were determined which govern the vibrations of tuning-forks, and definite relations could be proven between the hearing for the human voice and for certain tuning-forks. Nevertheless a number of defects still exist in this part of science, and unfortunately the views of the authors who are active in this department still diverge.

As regards the voice, the phonograph has shown that the objective determination of the pitch has replaced the old subjective method, because it furnishes more exact data. This method of determination of the constant elements of the voice is still imperfect, because we have found definite results only in the case of the vowels and not for the consonants. The pitch of the vowels varies under certain conditions. This depends especially upon the difference in the various languages and in the numerous dialects. The pitch also varies according to the preceding or

subsequent consonant. The rhythm of the voice is also of importance.

As regards the hearing distance, viz., the maximum distance at which the various tones of our voices can still be perceived, it has been shown that the pitch of the tones does not depend directly upon the rapidity with which the tones are produced. Of much greater importance are the physical conditions of the room in which the hearing tests are made, viz., the degree of freedom from noises, and especially the capability of the person examined to guess vowels and consonants which he does not correctly understand. Furthermore, at present the proportional relation of the tones of the voice to one another, when they are pronounced in a whisper or in the ordinary voice, is still unknown.

The same difficulties are present for the acoumeter or the watch. For the first, Gradenigo has computed a frequency of 400-468 double vibrations. There are instruments which produce tones of distinctly constant intensity and can be used for hearing tests. Though the pitch of these tones can be determined, it is much more difficult to estimate their intensity. Typical for these instruments is the tuning-fork. This instrument has the advantage of moderate cost. It can be produced of pure tone, free from overtones. Unfortunately the authors' opinions differ on one very important point, in what relation the intensity of the tones of a tuning-fork diminishes as the force dies out. Bezold and Edelmann have one opinion, Schmiegelow stands for the opposite side. Again, Gradenigo, basing his opinion on photographic impressions, suggests a different theory. Quix and Struycken, again, differ from these authors; and finally there is Ostmann, who has published a new method of objective acoumetry.

Different opinions are also held on the relation between the amplitude of the vibrations and the intensity of the tuning-fork tones. Some believe in a simple proportion, others in a quadratic relation. Again, others believe in a formula $i = a^{1.2}$ (i = intensity; a = amplitude).

The relative intensity of a tuning-fork in the various phases of its vibrations is also different. Opinions do not agree on determining the diminution of intensity of a tone on approaching or removing the tuning-fork from the ear. Finally, there are many points of difference of opinion in regard to the physiology of the

middle and internal ear, especially concerning bone-conduction—so that the entire value of an examination with the tuning-fork is uncertain. The more we study the examination of the hearing, the clearer it becomes how extremely complicated are the conditions, and how careful we consequently must be in deducting from the results obtained.

II. Simple and Suitable Methods of Hearing Examination for Ordinary Practice.

Owing to imperfections in our instruments for determining the hearing, it seems right to divide the functional examination into: (a) quantitative examination, or determination of hearing acuity, and (b) qualitative, or determination of the hearing defects for certain tones or segments of a scale. As we have seen above, the ordinary instruments do not give the pure tones free from overtones. On the other hand, unfortunately the tuning-forks, which do not suffer from this defect, cannot be employed to determine hearing acuity. At this point it would be desirable if we could give in figures the clang-tint of our instruments for examination.

With Quix the tones can be divided into three categories:

1. The *zona gravis*, including tones from *ut* to *ut*³; they are heard up to a distance of 6 metres.
2. The *zona mixta*, from *ut* to *fis*⁴; heard by the normal ear from a distance of 14–16 metres.
3. The *zona acuta*, from *ut*³ to *fis*⁴; audible up to 30 metres.

The hearing examination for the whisper not only gives us quantitative results, but under certain conditions furnishes a clue as to the qualitative hearing.

Practically we may perform the measure of hearing with fundamental and supplementary methods of examination.

Among the fundamental are counted:

1. Examination with the whisper and conversational voice.
2. Examination with the acoumeter of Politzer and the watch.
3. Examination with the tuning-fork (Schwabach, Weber, and Rinne experiments), and finally the determination of the field of hearing according to Zwaardemaker.

The supplementary methods include:

4. Examination with the continuous-tone series of Bezold.
5. Determination of the hearing field according to Hartmann and Gradenigo, supplemented by the determination of the high- and low-hearing limits.

6. Corradi's experiment.

7. Gellé's experiment.

8. Determination of the patency of the tube according to Politzer.

8. Electric reaction of the auditory nerve.

1. Examination with the voice: The three categories of Quix are reduced practically for the whisper to two, the *zona gravis* and the *zona acuta*. It is necessary to determine for every living language certain typical words, though in the hearing examination, in order to avoid the possibility of guessing, other words must be used in between. The conversational voice is suited for examination only in certain cases (as we cannot exclude the other ear), when both ears hear equally well, or when the other ear is very deaf.

2. Examination with Politzer's hearing measure and the watch: Notwithstanding its defects, the watch is a most convenient and, for determining the bone-conduction, a very excellent method of investigation. Politzer's instrument has a certain value in disturbances of hearing of medium or pronounced intensity. The author recommends, however, that the sound should be produced in a little different manner than is customary. Instead of using the thumb, the instrument should be moved like a bell, and the blows of the hammer should take place with more uniform intensity.

3. Examination with the tuning-fork: Owing to the great differences of opinion in relation to the intensity of sound and duration of vibrations, it seems proper to only study the duration of vibrations of the tuning-fork in their relation to the hearing threshold. As has been previously mentioned, the duration of perception of a vibrating tuning-fork and the relative intensity of the sound are not in a simple relation.

Schwabach's and Weber's experiments should be performed with forks of 128 D. V. They should be continued notwithstanding the various ways in which the results have been interpreted. Rinne's experiment should be tried with a fork of 64 D. V. It is surely much simpler than the methods advocated by Corradi and by Bonnier.

It is desirable to more clearly define the term "hearing field" (*champ auditif*). This term may include the area of the scale which is perceived by the ear—similar to the expression, "visual field,"—points in space up to which the ear perceives

certain tones. The term "hearing field" should be applied only to the first; for the second, the authors recommend the term "hearing horizon."

For the hearing-field determination, Zwaardemaker suggests four principal zones: (1) the contra-octaves; (2) the highest register of the singing voice; (3) the vowels; (4) the high consonants. To these correspond: (1) the lowest-tone limit up to 64 D. V.; (2) from 64 to 256; (3) from 256 to 2880 (Zwaardemaker), or, as the reviewer suggests, to 3072; (4) the tones situated above this limit. The *ut*⁸ and *sol*⁴ forks should be provided with a larger hammer in order to have all the same intensity.

The forks of Weissbach are more convenient than those of Bezold-Edelmann in determining the hearing field. To determine the lower-hearing limit, *G*₈, *C*₁, and *G*₁ forks (24, 32, and 48 D. V.) are recommended. The tuning-fork of 16 vibrations can scarcely be made use of in practice. To determine the upper-hearing limit, the Galton-Edelmann whistle cannot be recommended on account of its excessive price and defects. The rods of Koenig are preferable, and cylinders *ut*⁶, *mi*⁶, and *sol*⁶ are recommended.

The authors believe that the entire outlay for instruments for the determination of hearing should be about one hundred francs.

III. The Hearing Scheme.

To register the important findings, the scheme is suggested which Gradenigo demonstrated before the London Congress. Latin words are used. The names of the authors are designated by the beginning consonants:

S
A.D
W R. H. Hm. Ht. P. v. V
AS
AD
L. i. ut. ut⁸. sol⁴. L. s
A.S.

AD = right ear; AS = left ear.

S = Schwabach's experiment. If it results normally we put after the S ±, for longer than normal +, for shorter —; it is, however, necessary that there should be a discrepancy of at least three seconds from the normal.

W = Weber's experiment; an arrow directed either towards the right or the left ear denotes lateralization; if the arrow be absent, the experiment was negative.

R = Rinne's experiment (fork of 64 vibrations); if a higher fork be employed, this must be specially noted. The results are recorded according to the method of Bezold.

H = watch. The distance at which it is heard by the ear is expressed decimally. If it is heard only near the ear, by the word "prope"; if only on contact, "concha"; if not at all, "o."

Ht = watch heard at the temple or at the preauricular region; if it is heard in this region = +, if not = o.

Hm = watch on mastoid process.

P = Politzer's hearing measure, distance in metres.

v = whisper given with the residual air; distance in metres; if below one metre the number is approximated within 5cm, if over one metre within 25-50cm; a line separates the results of the examination with the tones of the zona gravis and the acuta; for instance, 1-6 denotes 1-metre whisper tones of the zona gravis to 6-metre whisper tones of the zona acuta.

If the whisper is heard only near the ear, "prope"; if it is perceived but not understood = ∞ ; if not heard at all = o.

V = conversational voice.

L. i. = Lower-tone limit. The hearing duration is expressed in one-hundredths of the normal.

L. s. = upper tone limit. Koenig's rod, which is still perceived, is noted.

There are still so many points in this important question which are obscure that we suggest the formation of a permanent international commission for the measurement of hearing, which shall meet once a year and report to each Otological Congress.

19. QUIX (Utrecht). The determination of the hearing distance for whisper and tuning-forks.

The author suggests dividing the whisper tones according to their constituent elements. It is also necessary to examine the tones for their intensity.

20. PANSE (Dresden). A new method of diminishing sound-intensity and of examining the ear objectively.

An apparatus is shown, consisting of the following parts: an ear-piece, which fits tightly into the meatus; a connecting tube of about 1m in length; and a sound receiver, closed with a disk.

The disk has a number of openings of various sizes, in front of which a vibrating, deep tuning-fork is placed. The perceived intensity of sound depends upon the size of the opening in the disk.

21. TRÉTRÔP (Antwerp). An attempt to measure the hearing in metres.

22. BONNIER (Paris). The measure of hearing and international tuning-forks.

A uniform scheme is suggested, a tuning-fork of one hundred vibrations, which is to be heard from the handle.

23. DELIE (Ypres). Tobacco and hearing.

The author warns against the abuse of nicotine, especially in individuals who already are suffering from sclerosing ear affections. Twelve cases were observed.

24. LANNOIS (Lyon). Disturbances of hearing in herpes zoster.

Herpes of the face and of the neck can, as is well known, be associated with facial paralysis, and in some of these cases there were also disturbances of hearing, such as hyperacusis, deafness, tinnitus, and vertigo.

The associated facial paralysis prevented an exact determination of the symptoms on the part of the ear, because in peripheral facial paralysis, owing to an involvement of the middle-ear muscles, all the symptoms may be the result of the paralysis of these muscles. Two cases are reported with disturbances of hearing, which were not accompanied by facial paralysis. He therefore regards the condition as a direct manifestation of the herpes of the face in infectious diseases of the auditory nerve.

25. ESCAT (Toulouse). On aural migraine.

There is an aural migraine, consisting in attacks of deafness, tinnitus, and aural pain. Most of the individuals suffered from hereditary otosclerosis, with early involvement of the labyrinth.

26. BOULAY and MARC-HADOUR (Paris). The psychical element in cases of deafness.

There are some patients who consider themselves deafer than they really are, and consequently do not take the trouble to hear. These can be considerably improved by the psychic influence of the physician and other appropriate treatment.

27. BOURGEOIS (Paris). On the diagnosis of bulbar disturbances of equilibrium.

A woman, forty-seven years of age, was suddenly taken ill

with severe right-sided headache, without loss of consciousness, severe vertigo, tendency to fall to the right, and right-sided myosis. When quiet, there was a slight horizontal nystagmus; on exposure to light, distinct rotatory nystagmus. Rarefaction of air in the right canal produced severe vertigo and nystagmus. There was, in addition, right-sided muscular weakness.

The autopsy revealed a syphilitic area of softening in the medulla oblongata, on the right side, beginning in the lower half of the olive, of the lateral tracts of the nucleus ambiguus, the descending trigeminal root, and the direct cerebellar tract.

The auditory tracts, especially Deiters's nucleus, were intact.

28. ROZIER (Pau). **The diagnosis of syphilis by the aurist.**

29. BRIEGER, VON STEIN, and DUNDAS GRANT. **The diagnosis and treatment of labyrinth suppurations.**

BRIEGER (Breslau). **Labyrinth suppurations.**

The labyrinth may be involved in every form of acute and chronic middle-ear suppuration. The process in the labyrinth usually follows the type of primary disease in the middle ear (simultaneous inflammation in the labyrinth in scarlet-fever suppuration, involvement in the formation of cholesteatoma). In tuberculosis of the middle ear the specific process does not always extend to the labyrinth, but a mixed infection is apt to invade the labyrinth through an opening made by the tuberculous process.

The entrance for the infectious agent in labyrinth suppuration is usually through an artificial route of communication from the middle ear. This communication may be the result of a traumatism. Lesions of the window-membranes transmit infections to the labyrinth more frequently than injuries to the semicircular canal.

Middle-ear suppurations usually extend by way of the oval window or by the horizontal semicircular canal to the vestibule.

The promontory is usually only affected in cholesteatoma and tuberculosis, where a clinically apparent communication between the middle ear and the cochlea exists. However, in certain acute suppurations, the inflammation may extend within the bone, which can only be recognized by the microscope.

There are pure labyrinth symptoms, which depend upon the particular part of the labyrinth affected, and must be distinguished from the symptoms which are induced by an involvement

of the neighborhood, as, for instance, the conditions occurring in the arachnoid space furnishing meningeal symptoms of a labyrinth suppuration, meningitis serosa.

Perforation into the labyrinth is not necessarily characterized by unusual symptoms in the course of a middle-ear affection. In some cases, especially in acute middle-ear suppuration, the sudden onset produces meningeal symptoms.

The temperature is also not affected in these cases, though the sudden onset of a labyrinth suppuration may cause a condition of collapse with subnormal temperature.

In the course of chronic suppurations of the labyrinth there may be transient rises of temperature. All of the labyrinth functions do not need to be affected.

If perforation take place into the vestibule the hearing may be unchanged. In progressive suppuration, and after the vestibule has been opened by operation, in the author's experience complete and pronounced deafness results.

Vertigo occurs in a great variety of degrees. In continued dorsal decubitus, labyrinth disturbances of equilibrium are mild or absent.

In lesions of the horizontal semicircular canal, nystagmus usually occurs on turning the eyes towards the healthy side. On probing a fistula of the semicircular canal, the eyeballs twitch in the form of a horizontal nystagmus without any fixation of the eyes, and persist during the increase of the vertigo. The same symptoms are observed when previously localized disease of the semicircular canal becomes general, or after the radical operation, or on the perforation of an acute otitis into the labyrinth.

Release of cerebro-spinal fluid by lumbar puncture may cause transient vertigo and nystagmus.

In labyrinth suppuration the symptoms of meningitis are sometimes present; paralysis of the muscles and changes in the eye-grounds may have this cause.

In many of the cases the diagnosis can only be made by exclusion, if the labyrinth symptoms do not disappear after operation or do not begin until later. In acute suppurations the sudden onset of these symptoms after exclusion of other complications points to an extension to the labyrinth.

After operation the diagnosis may be facilitated by finding fistulæ which may be followed into the labyrinth. Dehiscences

in the semicircular canal can be distinguished from the fistulæ by their regular form. Discoloration of the semicircular canal does not necessarily denote a suppuration in its interior.

After opening a labyrinth, the presence of a suppuration is recognized more by the presence of granulations than by the presence of pus. The discharge of perilymph is very variable. It may be absent in chronic suppurations.

Labyrinth suppurations may heal spontaneously after the filling out of the cavities with connective tissue and bone.

Labyrinth suppurations are more dangerous when the communications with the middle ear are very narrow. The perilymphatic space of the labyrinth and of the cavity may remain in open communication without a purulent meningitis following the labyrinth suppuration. The meninges show relatively large resistance against infectious agents coming from the labyrinth. They react to infections from labyrinth suppuration not only in the form of purulent meningitis but frequently by mild, curable, and relapsing inflammations.

Labyrinth suppurations in tuberculosis of the middle ear may cause a purulent meningitis if the pus contains a mixed infection. The tuberculous process within the labyrinth may partially or completely heal. A labyrinth tuberculosis causes a meningeal tuberculosis just as rarely as a labyrinth suppuration produces a purulent meningitis.

Operation may produce spontaneous cure of the labyrinth lesion. It is, however, not unusual that the operation causes a labyrinth suppuration to flare up, and causes a manifest and final meningitis. The operation for labyrinth suppurations in the presence of a labyrinth filled with pus may easily make the process much more dangerous than it was before.

The indications for opening a diseased labyrinth require more definite determination in the absence of greater experience.

The treatment at the present stage must consist in converting the labyrinth empyema with a very narrow or no opening into one with a large communication. The opening of the labyrinth should take place when there are no fistulæ in those places where perforation is most apt to occur from the middle ear into the labyrinth. The opening of the semicircular canal alone is not sufficient to drain the entire labyrinth.

If the labyrinth symptoms do not improve after exposure of the vestibule, and if the functional examination has shown

destruction of the cochlea, the cochlea should be opened from the promontory.

In deep extradural abscesses at the posterior petrous surface and in cerebellar tumors of labyrinthine origin, the vestibule can be opened posteriorly—in these cases, in addition to the lesion of the superior petrosal sinus, the jugular bulb may be injured if it is situated unusually high up.

VON STEIN (Moscow). Diagnosis and treatment of labyrinth suppurations.

The author comes to the following conclusions:

1. Thorough examination does not always show the presence of a labyrinth suppuration, as we have no absolutely certain method at present to diagnose one-sided lesions, especially in children.

2. In all cases of purulent inflammation of the labyrinth, more or less severe static and dynamic disturbances are present, even though the lesions be only partial or superficial.

3. A distinction should be made between paralabyrinthitis (affection of the bony capsule), and perilabyrinthitis (where pus or an exudate exists in the perilymphatic space), and endolabyrinthitis (an accumulation in the endolymphatic space); finally there is a panlabyrinthitis.

4. In paralabyrinthitis there is no disturbance of equilibrium.

5. The variety of surgical procedure depends upon which form is present, though it is difficult in advance to determine the extent of the lesion. Necrosis of the labyrinth is always manifested by labyrinth symptoms.

6. On removal of necrotic parts of the bony labyrinth, special precautions should be taken on account of the internal carotid, especially in children.

In most of the cases of purulent endolabyrinthitis, the opening of the vestibule is sufficient with careful curettage and insufflation of iodoform and daily dressings.

7. In a perilabyrinthitis the membranous semicircular canals should not be opened if one is not certain that pus is contained within the endolymphatic space.

DUNDAS GRANT. Practical conclusions from the latest experiences in labyrinth suppurations.

Jansen and Lucae discovered the relative frequency of labyrinth suppurations. Formerly they were unquestionably frequently overlooked. The mortality of cases not operated upon

has been calculated at about 50 %; this can be reduced to 20 % by operation.

According to Jansen, 62 %, and according to Whitehead 36 %, of labyrinth suppurations succumb to meningitis; according to Heine, fatal otitic meningitis was caused by the labyrinth in 42 % of the cases, according to Whitehead in 27 %. The reviewer, therefore, urges that cases of serous meningitis should be treated by lumbar puncture and opening of the labyrinth, in addition to the radical operation.

Cerebellar abscesses induce, according to Hinsberg, 12.5 %, according to Whitehead 54 %, of all the fatal labyrinth suppurations. According to Okada, 56 % of the cerebellar abscesses, and 71 % according to Whitehead, are produced by caries of the petrous bone, which almost always involves the labyrinth.

All other cerebellar abscesses are produced by sinus phlebitis. Hence, in cerebellar abscess without sinus phlebitis, the labyrinth should be opened and carefully inspected. In order to avoid injuries to the labyrinth, the author recommends burrs or very sharp chisels.

The opening of the labyrinth increases the danger of the operation. The suppuration, according to Jansen, in many cases is limited to the external semicircular canal. The progression of the suppuration from the labyrinth to the meninges is sometimes avoided by inflammatory connective-tissue formation in the internal auditory meatus.

Nerve deafness may be produced by non-purulent inflammation of the labyrinth, and is alone not a sufficient symptom to open the labyrinth.

30. POLITZER (Vienna). Pathological changes of the labyrinth in chronic purulent otitis media.

According to the author, these changes occur very much more frequently than has been imagined. Microscopic specimens were demonstrated.

31. PANSE (Dresden). Demonstration of ten specimens of labyrinth suppuration.

32. MOURE (Bordeaux). Kinematograph demonstration of a patient affected with disease of the labyrinth.

33. ESCAT (Toulouse). Three cases of cochlear necrosis, with spontaneous sequestration.

The two first cases, produced by chronic suppuration, are not of any particular interest. In the third case, there was an acute

labyrinthitis, due to scarlet-fever, without otitis media. The otitis media occurred later, and the cochlea was sequestered in full. The author assumes a septic thrombosis of the cochlear artery, with preservation of the branches going to the vestibule and the semicircular canal.

34. CHAVASSE (Paris). **Otitic extradural abscess "à distance," which perforated spontaneously through the parietal bone. Recovery.**

Discussion on Labyrinth Suppurations.

BOTEY (Barcelona): In case of suppuration, the labyrinth is always to be totally exposed. There are patients with labyrinth symptoms in aural suppurations without purulent labyrinthitis, and the reverse.

NEUMANN (Vienna): If the labyrinth suppuration advances by the preformed way to the interior of the skull, meningitis results. If bone necrosis occurs, a cerebellar abscess is formed. To be certain that lumbar puncture gives a sterile fluid, an anaërobic culture must be made. In that case, frequently pathogenic organisms are found.

VON STEIN (Moscow) recommends his goniometer to determine the more delicate disturbances of the functions of the labyrinth. One should at least make the patients attempt jumping experiments; walking alone is not sufficient.

BRIEGER (in conclusion): The operative treatment of labyrinth suppurations sometimes gives results which can be as little explained as the disappearance of certain cerebral symptoms after the opening of the cranial cavity. The condition at operation may be not at all marked or quite negative, though the opening of the labyrinth is followed by a rapid disappearance of the symptoms. The suppuration always extends first in the perilymphatic space. The extension in the endolymphatic space is secondary. The empyema of the endolymphatic sac is a symptom of diffuse labyrinth suppuration.

Purulent infiltration of the auditory nerves does not necessarily cause purulent meningitis.

Not only anaërobic bacteria may cause meningitis after labyrinth suppuration, but saprophytes, which are indifferent in the middle-ear cavities, may become virulent in the labyrinth and in the arachnoid spaces.

Lumbar puncture should not be neglected in cases of labyrinth

suppuration. It is interesting to note its action upon certain labyrinth symptoms—the occasional improvement of the vertigo and nystagmus—and the demonstration of pus in the spinal fluid in labyrinth suppurations without purulent meningitis.

35. LERMOYEZ and BELLIN (Paris). **On the surgical treatment of acute otitic meningitis.**

Two cases in which exposure of the diseased meninges in combination with lumbar puncture, with the positive presence of bacteria, resulted in recovery. In both cases subsequently large labyrinth sequestra were discharged. The infection consequently took place from the labyrinth.

Discussion.

BRIEGER (Breslau): The symptoms of meningitis are to a great extent associated with increase of cerebro-spinal fluid. Lumbar puncture may, therefore, modify the clinical picture—amelioration of the cerebral symptoms, the rigidity of the neck, the ocular paralyses, etc.—and may even seem to cause a change for the better for a short period. It seems, therefore, proper that therapeutically we should act in this direction by removal of the primary focus and evacuation of the increased and infected cerebro-spinal fluid. Craniotomy, with opening of the arachnoid space, has, under certain conditions, distinct disadvantages. Owing to the marked œdema of the brain tissue, enormous prolapses of the brain may occur, which are not always influenced by lumbar puncture. Incision of the brain in purulent meningitis may produce a brain abscess.

The danger of making a circumscribed meningitis general from lumbar puncture needs hardly to be considered because, first of all, circumscribed meningitis localized to a small area of the arachnoid space is extremely questionable. In otitic meningitis there are cases in which the meninges appear macroscopically over large areas entirely normal where, notwithstanding, an infectious process is present in the arachnoid space.

LERMOYEZ states that in his experience a paralysis of the abducent nerve is not absolute proof for an associated meningitis.

36. MOURET (Montpellier). **On direct communication between the mastoid antrum and the posterior wall of the petrous pyramid.**

This concerns the anatomic condition of the fossa subacuta.

37. LAFITE-DUPONT (Bordeaux). **The pneumatic cells of the middle ear.**

Anatomical investigation.

38. SZENES (Budapest). **Demonstration of pathological specimens.**

1. Alveolar melanosarcoma of the auricle. 2. Epithelioma of the auricle. 3. Osteoma of the external auditory canal.

39. BOTEY (Barcelona). **The prevention of atresia of the canal after the radical operation.**

The author describes his meatoplasty, which consists, after the complete operation, of dividing the meatus in the superior and anterior angle. Directly after this a perforated metal cone is inserted, which remains in from five to six weeks. Gauze is introduced within the cone.

LERMOYEZ (Paris) does not introduce the gauze into the wound but simply insufflates boric acid. The granulations disappear of themselves.

40. BOBONE (San Remo). **The preparation of the patient for operation.**

41. LOMBARD (Paris). **On the pathology of mastoiditis.**

The author draws attention to a group of cells which are situated between the sinus and the facial nerve, which are frequently involved and escape the operator's attention.

42. MOURET (Montpellier). **Sinus thrombosis on the sixth day of an acute purulent otitis media.**

Ligation of the jugular vein. Recovery.

43. CASTEX (Paris). **Hemorrhage from the jugular vein and later paralysis of the facial nerve.**

Injury to the jugular bulb by incautious curettage of the floor of the tympanum during operation. Nine days later facial paralysis, with recovery after two weeks.

44. MAHU (Paris). **On mastoiditis in cases of atresia of the meatus.**

The atresia, whatever its cause, is always a severe complication of otitis media.

Four cases are reported, in all of which the so-called Bezold perforation occurred. The author, therefore, recommends in cases of purulent otitis with atresia of the canal that the antrum should be immediately opened.

45. MASSIER (Nizza). **A case of otitic pyæmia without thrombosis of the lateral sinus.**

Multiple metastases. Recovery.

46. BAR (Nizza). **Perisinuous extradural abscess. Recovery.**

47. CLAOUÉ (Bordeaux). **Two cases of enormous cho-lesteatoma.**

48. CAUZARD (Paris). **A case of caries of both petrous bones.**

49. BAR (Nizza). **Vesico-pustular affection of the external auditory canal caused by pathogenic micro-organisms.**

50. MIGNON (Nizza). **A severe form of eczema of the auricle.**

A man eighty years of age, with long-standing eczema, made worse by an external otitis, occlusion of the canal, subsequent purulent otitis, mastoiditis, facial paralysis. Operation. Gangrene of the auricle. Sudden death from embolism. No diabetes; no albuminuria.

51. DIDSBUY (Paris). **Acute otitis media in an adult. No spontaneous or artificial perforation. Discharge of pus through the tube. Rapid recovery from the otitis. Complications in the neighboring structures.**

The complications consisted of a maxillary empyema and abscess in the lower turbinal.

52. **Operations and after-treatment of otitic brain abscesses.** By KNAPP (New York), SCHMIEGELOW (Copenhagen), and BOTEY (Barcelona).

KNAPP: The opening of the abscess can be undertaken in two ways:

(a) From the skull by means of the trephine or chisel (methods of the surgeon).

(b) From the ear. Exposure of the middle-ear cavities, removal of tegmen tympani and antri, following the path of the infection (method of the aurist).

The cerebellum is exposed by an incision along the posterior margin of the mastoid process up to the upper turn of the sigmoid sinus. In the presence of focal symptoms the focus must be directly sought for from the skull and the ear may be treated separately.

The evacuation of pus must be complete; the finger may be introduced into the abscess cavity. The walls of the cavity can be well inspected with the aid of Whiting's encephaloscope. If there is a great deal of pus careful irrigation is of

advantage. If the opening gapes, a drainage tube or gauze is not required.

During the after-treatment cerebral hernia requires special attention. It usually results from the formation of a secondary abscess which must be opened. The prolapse then usually disappears slowly and does not need to be excised. Relapses of brain abscesses are apt to occur if the opening be too small.

SCHMIEGELOW: The opening in the skull should be so made as to permit access both to the cerebrum and to the cerebellum, as it is not always possible beforehand to locate the site of the abscess.

The narcosis (ether or chloroform) should be given with extreme caution.

Every otitic abscess should be explored from the fully exposed ear cavities.

For opening, a scalpel is most serviceable; drainage by a rubber drain.

BOTRY advances the same opinions.

He suggests preliminary puncture through the dura, then opening with the scalpel, and does not advocate irrigation. Drainage with rubber tube to be changed daily.

The prognosis of brain abscess is always serious because of the frequent relapses and complications.

53. GRADENIGO (Turin). **Paralysis of the abducent nerve as a symptom of endocranial complications of otitis.**

The author has observed twelve cases. Associated homogeneous paralysis of the abducent nerve is due to a local leptomeningitis which is the result of an infection travelling along preformed paths. The meningitis remains localized and in most cases recovery occurs.

54. TOMMASI (Lucca). **Two cases of otitic cerebral abscess.**

Discussion on the Operation of Brain Abscess.

MACEWEN (Glasgow): In otitic abscess of the brain it is not sufficient to remove the primary focus in the bone and the secondary focus in the brain, but the intermediate path must be eradicated; otherwise secondary abscess will result. Therefore, in the cases in which a delay of twenty-four hours is possible after the mastoid operation and exposure of the dura, Macewen introduces small pieces of gauze soaked in 5% carbolic acid

between the dura and the bone to induce adhesions. Usually these are formed within twenty-four hours, or in certain cases it is proper to wait an additional twenty-four hours. The abscess is then opened. Chloroform is better than ether, as the latter causes brain oedema and symptoms of compression. An extensive incision is made and then careful irrigation with a 2½% carbolic-acid solution. Gauze is better than a rubber drainage tube, though the author does not drain in any case. In the operation for cerebellar tumor the veins are likely to be injured in opening the dura. The author has observed one case of air embolism induced in this manner.

URBAN PRITCHARD (London) and DENCH (New York) advocate drainage with rubber tubes.

BRIEGER (Breslau): Wide opening of the cerebral abscess does not always ensure complete elimination of the infectious organisms. In the causation of brain abscess, just as for meningitis, there are certain micro-organisms which are saprophytic in the middle ear and later become pathogenic after they have reached the brain tissue. Their products may remain toxic even after the evacuation of the abscess.

On the other hand, there is danger of an infection of the arachnoid space, especially if the adhesions be separated. Their action does not necessarily mean a meningeal suppuration. There may be an oedema in the entire arachnoid space (meningitis serosa) which may produce ocular paralysis and optic neuritis after evacuation of the abscess.

In some cases the pus in the abscess is not so infectious as to produce this result. An abscess may, for instance, be in permanent or transient communication with the lateral ventricle by a plug of fibrin, and parts of the purulent contents may circulate in the arachnoid space without producing a purulent meningitis.

As to the remarks of Gradenigo, conditions such as he has described are observed in the course of chronic purulent otitis. In uncomplicated suppurations localized to the middle ear, lesions, especially of the abducent nerve, involving the trunk at the base or the nucleus, may occur with severe headache. Though these are only slowly affected by relief of the pressure, as by the evacuation of an extradural abscess, they are apt to disappear immediately after lumbar puncture if a large quantity of apparently normal spinal fluid is evacuated under pressure.

The continuation of disturbance of equilibrium after the

operation for labyrinth suppurations does not mean that a cerebellar abscess is present. Disturbances of equilibrium are usually rare in abscesses of the cerebellum and are qualitatively different from labyrinth vertigo.

This usually ceases very gradually after an operation—never so rapidly that from its continuation diagnostic deductions are possible.

55. MOURE and BRINDEL (Bordeaux). 500 cases of operation on the mastoid process.

Within the last nine years 269 radical operations and 231 simple operations have been performed upon the mastoid process.

The greatest frequency of radical operations occurred in the second decade; of simple operations, in the third.

42 cholesteatoma, 6 sinus thrombosis, 9 extradural abscesses, 5 brain abscesses, 12 labyrinth suppurations.

In 113 the internal table of the skull was affected, the dura was covered with pus and granulations.

In 38 the sinus was displaced anteriorly, while in 22 it occupied the region of the antrum directly beyond the canal; in 16 it was separated by about 1 cm from the canal.

In 10 cases a group of cells was observed in the petrous pyramid, situated between the sigmoid sinus and the facial canal, extending in the direction of the internal auditory meatus.

142 radical operations were made for chronic otorrhœa; all were healed.

127 were operated on for associated complications; 18 of these died.

Of 231 simple operations, 14 died.

56. POLI (Genoa). On the diagnosis of a presumable case of auricular epilepsy.

A lawyer, thirty-six years of age, neurasthenic, was taken ill in May, 1903, with typical epileptic attacks which occurred each month. In May, 1904, he suffered from a discharge from the right ear without pus. A fistula was found in the upper wall of the canal. Drum intact, good hearing, no labyrinth symptoms, slight tenderness at the upper attachment of the auricle, negative eye-grounds, urine normal, as well as sensibility, motility, and reflexes. Since the onset of the suppuration, which is continuing, the epileptic attacks have ceased.

57. SZENES (Budapest). A case of hysteria due to an acute purulent otitis.

58. BOUYER (Fils) (Cauterets). **Hysterical otalgia and aural surgery.**

59. MASSIER (Nizza). **Bilateral mastoiditis with brain symptoms during puerperium.**

Recovery without operation.

60. BRUDER (Paris). **Disadvantages in the use of hydrogen peroxide in otology.**

1. Nearly neutral hydrogen peroxide is alone to be used.

2. Before its application several drops of fluid vaseline should be insufflated into the canal to prevent maceration and burning of the epithelium.

3. If this, however, takes place, the use of this peroxide should be given up and dressings with sterile vaseline applied. Notwithstanding, the author finds that hydrogen peroxide is of considerable service.

61. HOFFMANN (Dresden). **Osteoplastic operations for chronic suppuration in the frontal sinus.**

The author describes his method of operating with a flap composed of skin, periosteum, and bone. In order to obtain a permanent communication with the nose a spiral drain of silver is introduced and remains for three months.

62. MAHU (Paris). **Moulages.**

These casts are made by Tramond and represent:

(a) Radical operation of the maxillary antrum after Caldwell-Luc.

(b) Radical operation of the frontal sinus and of the ethmoid labyrinth according to Killian.

63. HOFFMANN (Dresden). **Demonstration of cysts of the superior maxilla.**

64. AUBARET (Bordeaux). **Topographic anatomy of the ethmoid labyrinth.**

65. AUBARET. **Shot wounds and foreign bodies in the antrum of Highmore.**

66. BOBONE (San Remo). **Petroleum in the treatment of ozæna.**

67. ROYET (Lyon). **On the symptomatology of adhesions between the posterior lip of the tube and the pharyngeal wall.**

68. ROURE (Valence). **On the passage of bougies in the tubes in cases of dry middle-ear catarrh.**

Demonstration of a steel bougie and a modified catheter.

69. FARACI (Palermo). **A new ear pump.**

70. KOENIG (Paris). **Modified ear catheter which permits the escape of fluid collected in the middle ear.**

There is a canal along the back of the eak.

71. KOENIG (Paris). **On passing bougies in the tube.**

A modification of the catheter which allows the introduction of the bougie and also the air douche. The bougie is introduced into a small channel which opens into the canal of the catheter. During the simultaneous air douche with the double bag by the patient the introduction of the bougies is very much simplified. A different catheter is required for each side.

72. KOENIG (Paris). **Lucae's pressure probe of paraffin.**

The tip is first introduced into the soft parts. The pressure upon the short process of the hammer is thus less painful.

73. SUAREZ DE MENDOZA (Paris). **Should adenoids be removed with narcosis or not?**

The author is opposed to the use of narcosis in this operation and uses it only in exceptional cases.

74. LAFITE-DUPONT (Bordeaux) **demonstrated an apparatus for the application of chlorid of ethyl.**

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

By DR. T. PASSMORE BERENS, ACTING SECRETARY.

MEETING OF MAY 23, 1905. DR. DENCH, PRESIDENT, IN THE CHAIR.

Dr. TOEPLITZ presented a patient on whom he had **operated for cholesteatoma and chronic residual post-operative mastoiditis**. The operation was the Schwartz-Stacke, into the wound of which he carried a flap of skin taken from between the auricle and the hair-line, thereby securing a permanent dry opening behind the auricle.

Dr. BERENS questioned the wisdom of the procedure, and thought the same curative result might have been secured by the conventional method.

Dr. SHEPPARD related a case of **repeated exfoliation of epithellium** in the middle-ear antrum cavity of a patient on whom he had performed a Schwartz-Stacke operation.

Dr. MAY reported a case of **facial paralysis following intratympanic curettage** for cholesteatoma. The patient had refused a radical operation. There was no improvement of the conditions after two years of treatment.

Dr. KIPP reported a case of **gangrene of a cerebral hernia**, which he removed from a patient previously operated upon for septic sinus thrombosis. The patient died of meningitis. The pathological report on the specimens presented by the laboratory of the College of Physicians and Surgeons was tuberculosis.

Dr. GRUENING called attention to a case he had previously reported of **cerebral hernia** that was materially aided in its recovery by the use of contractile collodion.

He mentioned a case of prolapse of the brain, in which the prolapsed portion came away as a slough and the wound healed.

A few weeks later, there was a flow of clear fluid from the external auditory canal, but no other symptoms of disease. The case is still under observation.

Dr. McKERNON related a case which **discharged clear fluid (cerebro-spinal ?) from the external auditory canal**. The external auditory canal was full of a polypoid mass. The temperature, which was 103° F., dropped to normal after lumbar puncture, and the discharge from the ear ceased. He always considered the wisdom of operation in these cases a question. He would not operate unless the temperature remained high. He had seen two similar cases, in one of which operation was disastrous.

Dr. GRUENING had seen the first case mentioned by Dr. McKernon, and thought the mass described by Dr. McKernon as a polypoid mass was in reality a mass of brain tissue covered by skin. He thinks continued lumbar puncture better than operation in most of these cases.

Dr. McKERNON reiterated his belief that the mass was a polypus.

Dr. GRUENING considered these cases of cerebral hernia with leakage of cerebro-spinal fluid to be fistula of the ventricle.

Dr. McKERNON has had under observation for seventeen months a case on whom he had **operated for lateral sinus and jugular-vein thrombosis**. Four or five months after the operation, cerebro-spinal fluid appeared in the external auditory canal. There have been two attacks, each accompanied by elevation of temperature. Each attack was relieved by the removal of a polypoid mass through the canal. He does not advocate operation in these cases.

Dr. DENCH stated that he had seen a number of cases of **prolapse of the brain**. They all died. In one case he opened the fourth ventricle. The case lived fourteen days and died of spinal hemorrhage. He considers a true prolapse (encephalocele) is always indicative of intracerebral pressure, due to inflammatory action.

Dr. GRUENING reported a case of **diphtheria occurring in a mastoid wound**. The operation was performed during an attack of faucial diphtheria. The patient recovered.

Dr. MAY reported that he had performed a **double mastoid operation** during active faucial diphtheria, without infection of the wound. The patient recovered.

Dr. PHILLIPS reported a case **presenting symptoms of a lateral sinus thrombosis** after operation for acute mastoiditis. Operation failed to disclose disease of the sinus. The patient recovered.

Dr. MCKERNON thought it was an infection of the sinus, possibly a parietal clot, with which statement Dr. GRUENING agreed, and said that he had seen a number of similar cases.

Dr. GRUENING reported a **death from tuberculosis** of a patient on whom he had operated for mastoiditis. The operation revealed extensive involvement of the zygomatic cells.

Dr. SHEPPARD reported a case of **possible infection of the knee-joint** following a radical mastoid operation. The joint recovered without suppuration.

He also reported **symptoms of inflammation in the shoulder-joint** following operation for septic lateral-sinus thrombosis. Pus did not develop and the patient recovered.

He also reported a case **presenting symptoms of abscess of the liver**, and accompanied by symptoms of infection of a number of joints following operation for acute mastoiditis. No pus developed and the case recovered.

Dr. KIPP said that he had had similar cases, and asked how a diagnosis of rheumatism could be excluded. Dr. Kipp said that he had observed similar conditions following tonsillotomy.

Dr. MCKERNON related a case of **fatal septic endocarditis** following acute purulent otitis media.

REPORT ON THE PROGRESS IN OTOTOLOGY FOR THE SECOND QUARTER OF 1904.

(Concluded.)

BY PROF. ARTHUR HARTMANN, BERLIN.

c.—DISEASES OF THE ACCESSORY CAVITIES.

199. ONODI. An anomalous frontal sinus. *Archiv f. Laryngol.*, vol. xv., No. 33.
200. STRUBELL. On the relation of the blood-vessels of the antrum of Highmore to the teeth. *M. f. O.*, 1904, No. 6.
201. GOMPERZ. On foreign bodies in the antrum of Highmore. *Archiv f. Laryngol.*, vol. xv., No. 29.
202. BARTHA and ONODI. Primary carcinoma of the frontal sinus. *Archiv f. Laryngol.*, vol. xv., No. 13.
203. KIRCHNER. Endothelioma of the maxillary antrum. *Archiv f. Laryngol.*, vol. xv., No. 1.
204. CITALLI. Cylindroma of the sphenoidal sinus. *Archiv f. Laryngol.*, vol. xv., No. 20.
205. DELSTANCHE. The treatment of the maxillary sinus in the eighteenth century. *La presse oto-laryngologique Belge*, 1904, No. 5.
206. BROECKHAERT. Some remarks on the radical cure of chronic empyema of the frontal sinus. *Annales de la société de méd. de Gand*, 1904, p. 13.
207. DELIE. Frontal sinusitis, with anomalous sinus. *La presse oto-laryngologique Belge*, 1904, No. 6.
208. POLYAK. A case of multiple latent accessory sinus suppuration, with the formation of bony cysts, exophthalmos, and atrophy of both optic nerves. *Archiv f. Laryngol.*, vol. xv., No. 28.
209. COAKLEY. An easy method of entering the sphenoidal sinus for diagnostic purposes. *The Laryngoscope*, April, 1904.
210. MERTINS. Empyema of frontal sinus, followed by extradural abscess and abscess of frontal lobe; operation, and death from hypostatic congestion of the lungs. *Amer. Jour. of the Med. Sciences*, Philadelphia, April, 1904.

211. WHITEHEAD. A case of empyema of the right frontal sinus, of the right sphenoidal sinus, of both antra of Highmore, and of the ethmoidal cells on both sides. *ARCH. OF OPHTHAL.*, May, 1904.

212. FETTEROLF. Reflex cardiac inhibition, resulting from irritation of the peripheral fibres of the trifacial nerve, and occurring in the course of an operation for chronic empyema of the frontal sinus. *Amer. Medicine*, March 19, 1904.

213. DOUGLASS. The question of intranasal operation upon the frontal sinus. *The Laryngoscope*, May, 1904.

214. BAILEY. Empyema of the frontal sinus in a case with supernumerary sinuses on each side. *The Laryngoscope*, May, 1904.

215. LEE. Concerning the sinus frontales in man, with observations upon them in some other mammalian skulls. *Bull. of Johns Hopkins Hospital*, April, 1904.

216. MERTINS. Empyema of the frontal sinus and extradural abscess of the frontal lobe. *Amer. Jour. of Med. Sciences*, April, 1904.

199. Two skulls presented the following anomaly, consisting in a recess of the inferior part of the frontal sinus, which extended backward, and without doubt was connected with the development of the anterior ethmoidal cells and of the frontal sinus.

ALBANUS.

200. In order to study the extension of disease from the alveolar processes to the maxillary antrum, and *vice versa*, the author made injection specimens of the vessels which he examined, and found that the following three structures, viz., the mucous membrane of the maxillary antrum, the periosteum, the spongiosa of the superior maxilla, and the teeth are supplied by a system of blood-vessels, which anastomose among one another in an extremely complicated manner. It will be only possible to determine the relation of nasal to dental empyemata by a careful examination of pathological specimens.

PIFFL.

201. In order to irrigate through the maxillary antrum painlessly, the author cocaineizes the area selected by Mikulicz in the lower meatus. In withdrawing the applicator, the pledget of cotton remained in the maxillary antrum. Two weeks later, suddenly, in irrigating, the return flow from the nose was arrested, and by a forcible expiration the pledget of cotton was discharged into the canula.

ALBANUS.

202. A man, thirty-seven years of age, suddenly felt, four months ago, as if he had received a blow on the forehead. He heard a crack, and became unconscious. After this, increasing

headache, diminution of sense of smell, swelling in the left internal angle of the nose. Examination showed a broadened root of the nose, the left frontal region prominent, the left upper eyelid protruded by a tumor as large as a hazel-nut. The left eyeball was forced somewhat outwards. Nasal respiration was not interfered with. The sense of smell on the left side was preserved. On transillumination, both frontal sinuses were dark. Operation. Tumor masses were found under the skin of the dorsum of the nose. On the left nasal bone there was a defect $1\frac{1}{4}$ cm long. The left frontal sinus was filled with the tumor, which had perforated into the other cavity. The posterior frontal sinus wall and part of the ethmoid were destroyed. The lower surface of the frontal lobe in the middle line was easily visible. The tumor was separated from the orbit by periorbital tissue, from the nasal cavity by the nasal mucous membranes. Convalescence uninterrupted, without any brain symptoms. In the second half of the month, relapse; loss of sense of smell on both sides. Disturbance of taste. Microscopic examination of the tumor showed a typical cylindrical epithelioma, which in places was covered by a stratified pavement epithelium. The basement cells were of a solid cystic parakeratotic type.

ALBANUS.

203. The author has examined two cases which had been operated upon by Jansen. 1. Nasal polypi had been removed for six years, then pain in the eyes and forehead, occasional nausea, and vomiting. No glandular involvement. Radical operation on both maxillary antra. Relapse after four weeks, which required another operation. A microscopic examination of the tumor showed tumor cells situated diffusely or in groups in a connective-tissue stroma. It is possible to trace the direct extension from the lymphatic endothelium to the tumor cells. The author regards the cylindrical structures found in the tumor as due to a hyaline degeneration of the blood-vessels, the concretions as a form of colloid degeneration of the surrounding cells. The differential diagnosis with carcinoma and sarcoma is reviewed. 2. Inoperable tumor of the left maxillary antrum and the left nasal bone, which is now extending to the other side displacing the eyeball, causing amaurosis with extension into the ethmoid and into the naso-pharynx. Palliative minor operations were repeatedly performed, thus furnishing particles of tumor. The microscopic condition was similar to Case 1. Nowithstand-

ing the similarity in structure, the first was benign, while the second was malignant.

ALBANUS.

204. A patient fifty years of age suffered from progressive occlusion of the nose. The vision of the right eye was diminished, then lost. Finally severe headache. Right exophthalmos; blindness. Left diminution of vision. Hardness of hearing, especially for high tones. The right nasal cavity shows, posteriorly and above, fungus masses, which are also to be seen post-rhinoscopically and cover the right choana. The sense of smell is lost. Particles of the inoperable tumor on examination showed endothelioma with hyaline degeneration—*i. e.*, cylindroma.

ALBANUS.

205. The author describes the diseases of the maxillary antrum, their symptoms and treatment as practised in the eighteenth century, from a book published by Bordenave in 1758 at Paris.

BRANDT.

206. The author recommends Killian's operation for a radical cure in chronic suppuration of the frontal sinus. There are no case-histories.

OPPIKOFER.

207. On the left side there was an unusually small frontal sinus, which was situated entirely within the supraorbital arch, while the sinus on the right side was comparatively extensive.

BRANDT.

208. A laborer, twenty-four years of age, suffered from occlusion of the nose, then distension of the external parts of the nose, pressing the hard palate downwards. Four years ago the vision in the right eye diminished. The left eye protruded, the right also became prominent, and finally both eyes became blind. Treatment with potassium iodid without result. On examination a broad, bony distension was visible in both inner angles of the eyes. The eyes are pushed forward and externally. On both sides complete optic atrophy. The cheek and upper lip were thickened. The hard palate was protruding downwards. The septum was deviated towards the right side. On the left a large smooth tumor, in all places adherent to the walls of the nose, leaving a small space just above the floor. Both choanæ were filled with the tumor. No enlarged cervical glands. General condition good. Nasal respiration interfered with, and blindness. In order to extract the tumor more easily, the author inserted a knife to divide it. About 200ccm of pus were evacuated

under high pressure. The bony cyst was removed. According to the author, the suppuration of the bony cyst of the left middle turbinal was the primary disease. This cyst increasing in size gradually closed the openings of the ethmoid and sphenoid cavities. These were then dilated and led to the previous symptoms. Treatment was followed by an improvement in the general condition and free respiration. Optic atrophy of course was not influenced. It is remarkable that the patient had never suffered from pain. ALBANUS.

209. A thin applicator curved slightly upward for about $\frac{1}{4}$ inch and wound with cotton at the end is passed between the middle turbinate and the septum, the uncurved part $\frac{1}{4}$ inch above and parallel to the lower border of the middle turbinate, until it reaches the anterior surface of the sphenoidal bone. The applicator is gradually withdrawn and pushed forward, until it suddenly passes through an opening into a cavity to a depth of half an inch. M. TOEPLITZ.

210. The abscess pointed at the glabella. Incision. Five days later severe pain, vomiting, and convulsions. Probe passed readily through wound into cranial cavity. Operation showed area of necrosed bone size of silver dollar covering an extended abscess. Pus in left frontal sinus, right sinus healthy. The dura pulsated only on the left side; no fistula. A hollow needle evacuates pus from the right side. Second operation. Abscess opened and packed. Autopsy found the abscess well encapsulated. BRYANT.

211. Removal of the anterior wall of the sinus disclosed the backward extension communicating with the anterior ethmoid cells, where the dura mater was exposed. The author deprecates operating which is not thorough, since this case shows the futility of a superficial operation. BRYANT.

212. During the operation of a chronic empyema of the right frontal sinus of a man, aged thirty-five, a trigemino-cardio-inhibitory reflex occurred. Each time the curette would be applied to the sinus wall, there was a marked diminution in the force, fulness, and frequency of the pulse along with distinct cyanosis. The curetting had therefore to be frequently interrupted. This phenomenon is also noticed in dental operations, and a similar reflex has been proved to occur in operations on the ear involving areas supplied by the fifth nerve. M. TOEPLITZ.

213. DOUGLASS investigates the anatomical relations of the frontal sinus, in order to ascertain, if it is justifiable to enlarge the opening into the sinus sufficiently to secure thorough drainage and subsequent entrance with instruments. Five reasons show the dangers and difficulties encountered in intranasal operations, the two greatest being the second and the fourth. 1. The frontal sinus may be absent. 2. The posterior wall of the sinus may vary greatly in its height from the naso-frontal duct from 4 to 40mm. 3. An anterior ethmoidal cell may be mistaken for the sinus. 4. The naso-frontal duct is separated from the olfactory fissure by the very thin processus uncinatus. 5. The direction and position of the naso-frontal duct varies considerably. The duct may open quite posteriorly, thus becoming more oblique. The problem of the intranasal operation consists in reaching the floor of the sinus, which lies away from the brain, in a safe way, viz., to remove the anterior edge of the processus uncinatus, the anterior wall of the naso-frontal duct, and that ridge of bone which projects from the anterior wall of the sinus and base of the nasal bone. For the removal of this ridge, cutting instruments must work at an angle forward of about 45° , and externally at an obliqueness of about 5° from the perpendicular.

M. TOEPLITZ.

214. A middle-aged man was suffering from extreme pain over the right eye. The right frontal sinus was opened and drained. No improvement, but meningitic symptoms and death took place. The autopsy revealed the existence of a double frontal sinus on each side; each posterior sinus of the same size as the anterior, opened by separate passages into the middle meatus of the corresponding side. In the right posterior sinus there was caries of the posterior wall, from which the suppuration had extended, causing a diffuse suppurative meningitis.

M. TOEPLITZ.

215. LEE made a series of metallic injections of the sinus frontales, the technique of which is fully described, of twenty-one adult male subjects, in ages ranging from twenty-five to sixty years. The sinus frontales vary in respect to symmetry, not only by deflection of the septum, but also in other characteristics. The pars frontalis is separated in varying degrees from the pars orbitalis by the septum interpartes. The cavities are subdivided by bony trabeculæ, called septa lateralia in the pars frontalis, septa dorsalia in the pars orbitalis. The sinus frontalis

may be absent throughout life. The superciliary arch does not furnish precise information concerning the size of the sinus beyond. Out of twenty pairs the right sinus was largest in thirteen, the left in three; the remaining four were about equal. Out of nineteen cases the pars frontalis was largest in thirteen. The septa do not bear any relation to the size. The pars orbitalis existed bilaterally in ten crania. It may consist of one or many chambers. The sinus frontalis of the ox excavates the frontal, parietal, and occipital bones, only the peripheral portions of the very large cavity being divided by thick trabeculæ into small pockets. The sinus extends up into the horn, which near its base is also trabeculated, as a protection against traumatism. The frontal sinus of the pig's skull excavates the frontal and a portion of the parietal bone. The sinus frontalis in the sheep is limited to the ventral and lateral portions of the frontal bone, and is subdivided into two portions, like in the pig's skull, by a septum interpartes with much sacculation at the periphery. In the dog the frontal sinus shows an irregularly spherical or ovoid cavity in the frontal bone, divided by a septum and with less sacculation. In the skull of the cat the sinuses are limited to the frontal bone, separated from each other, and divided into partes frontales and orbitales, with a septum interpartes, but without trabeculæ. In monkeys there is no sinus frontalis present, notwithstanding the well developed arcus superciliaris. There are a number of dilated bony cells taking the place of the sinus.

M. TOEPLITZ.

216. A boilermaker, æt. forty, had suffered for six months from steadily increasing violent headaches. Within the last three days before Sept. 8, 1903, a fluctuating swelling with harder rim, of the size of a goose-egg, had appeared in the region of the glabella. He had syphilis sixteen years ago and had received a blow from a hammer on the top of the head two years ago, which had made him unconscious for several days. The abscess was incised and an ounce of foul pus was evacuated with relief. On the third day the pain returned, the flow of pus increased, but when the head was held forward the pain decreased. On Sept. 13th the pain grew more severe; vomiting and three convulsions occurred. On the following day the cerebation was slow, but relevant. Necrosed bone was found in the wound on probing, whereby the cranial cavity was entered. On Sept. 14th, by a long incision, necrosed bone, of

the size of a silver dollar, of dark brown color, like the top of a pepper-box, was laid bare; from numerous fistulæ pus oozed at each respiration. It was removed by trephine. An extradural abscess, containing about an ounce of pus, was laid bare and the opening enlarged to the size of a dollar by the rongeur forceps. The dura was adherent all around to the frontal bone. By the removal of necrosed bone, the left frontal sinus containing half an ounce of pus was opened. The right frontal sinus was healthy. The dura was very thick, of dirty yellowish color, and pulsated on the left side only. No fistulæ. The needle found a few drops of pus on the right side only. Sept. 23d: Transient paresis of right internal rectus; right optic neuritis. Sept. 25th: Mental condition more obscured. Another aspiration of the right frontal lobe was made. A cavity was entered $3\frac{1}{2}$ inches deep; pus flowed into the aspirator. By the opening of the blades of scissors, $1\frac{1}{2}$ ounces of creamy pus and a yellowish lump of broken-down brain tissue were evacuated. The cavity was gently curetted. Improvement followed: rise of pulse, abscess cavity growing smaller, discharge and granulations formed over the exposed dura less, appetite good, mind clear. Sept. 30th: Temp. 102° ; hypostatic congestion of inferior lobe of right lung. Oct. 3d: Involvement of left lung. Death. Autopsy: Depressed fracture, $\frac{1}{2}$ inch deep, on left parietal bone with opening at the bottom. Dura here and around the trephine opening adherent to bone and brain. The posterior wall of the sinus was necrosed and a fistulous tract led from the sinus to the extradural abscess. The abscess in the brain was $1\frac{1}{2}$ inches deep and well walled off. The pulmonary hypostasis was the cause of death.

M. TOEPLITZ.

f.—OTHER DISEASES OF THE NOSE.

217. BAUROWICZ. Congenital bilateral closure of the anterior nares. *Archiv f. Laryngol.*, vol. xv., No. 12.

218. BROECKHAERT. Vegetative rhinitis. *La presse oto-laryngologique Belge*, 1904, No. 6.

219. GELLÉ. Nasal hydrorrhœa of traumatic origin. *Arch. internat. d'otol.*, etc., 1904, p. 817.

217. On the day of birth a male child presented an occlusion of the nares. The author saw the patient three months later, a poorly developed child, with a funnel-shaped closure of both openings in a broad and short nose. On both sides there was

a very small fistula in the skin. Operation with the electro-cautery; after-treatment with nasal tubes. The author believes that this anomaly occurred in the first half of the second month and depended upon a disturbance of development.

ALBANUS.

218. A variety of chronic rhinitis is described, in which small flat tumors appear on the mucous membrane of the septum and occasionally on the turbinals. The tumors show the histological structure of simple granulation tissue without any tuberculous characteristics. They are to be regarded as inflammatory hyperplasias of bacterial origin.

BRANDT.

219. In an attempt to commit suicide, the bullet passed between the hard and soft palates and perforated the lamina cribrosa of the left ethmoid, as was shown by an X-ray picture. The patient recovered, though for forty-one days a great deal of cerebro-spinal fluid escaped from the nose. Then the discharge ceased and complete recovery took place.

OPPIKOFEK.

g.—NASO-PHARYNX.

220. FINDER. A peculiar form of adenoid vegetation. *Archiv f. Laryngol.*, vol. xv., No. 34.

221. LUBINSKY. Some remarks on adenoid vegetations. *Berl. klin. Woch.*, 1904, No. 28.

222. URBANTSCHITSCH. Some precautions in operations for adenoid vegetations. *M. f. O.*, 1904, No. 24.

223. ROSENSTEIN. Modification of Beckmann's curette. *Münchn. med. Woch.*, 1904, No. 1.

224. MANHENKE. A case of pyemia after operation for naso-pharyngeal polypus. *Münchn. med. Woch.*, 1904, No. 7.

225. STENGER. Malignant tumor of the naso-pharynx. Purulent mastoiditis. *A. f. O.*, vol. lxi., p. 247.

220. A pharyngeal hyperplasia, as large as a dove's egg, was removed from a child, eight years of age, which apparently did not differ in any way from an ordinary pharyngeal vegetation. The tumor hung down into the naso-pharynx, and could be seen on lifting the soft palate as a thick growth with nodular surface. Microscopically it showed lymphatic tissue in a papillomatous structure which, according to the author, was produced by irritations caused by pressure from the soft palate.

ALBANUS.

221. The author describes the relation of adenoid vegetations to scrofula, to diseases of the eyes, diseases of the respiratory passages, disturbances of digestion, constitutional diseases, tuber-

culosis, aprosexia, and other diseases. The operation should be undertaken, even for moderate hyperplasias, as soon as they produce any symptoms whatever. MÜLLER.

222. The protection consists in a little bag which is attached to a ring-shaped pharyngeal tonsillotome, which catches the tonsil after it has been excised. PIFFL.

223. The handle of the instrument is curved in a concave direction to the point where it lies on the lower jaw.

A similar instrument has been used in the Munich ear clinic for years. SCHEIBE.

224. One day, after a secondary operation for naso-pharyngeal fibroma with a cold snare, pyæmia occurred, which ended fatally. No packing was introduced. In literature there is only the account of one similar case of pyæmia. At autopsy, the naso-pharynx showed no signs of inflammation.

According to the author, the cause for this unfortunate incident lay in a septic thrombus which was loosened at the time of the after-operation, and thus immediately attained the general circulation. SCHEIBE.

225. A probable sarcoma of the base of the skull, possibly arising from the sphenoid bone. At first the tumor gave only the symptoms of a catarrh of the Eustachian tube, with subjective noises and deafness. These symptoms continued, with severe headache. The vision diminished; there were muscular paralysis of the eye, purulent mastoiditis, exophthalmos, finally paralysis of the extremities. Death. No autopsy. With the onset of the mastoid suppuration, an extradural or brain abscess was surmised, and an operation undertaken. Later on, by the appearance of the tumor in the nasal cavities and in the naso-pharynx, the nature of the process was made clear. HAENEL.

h.—PHARYNX AND MOUTH.

226. KATZ. Tuberculosis of the soft palate. *M. f. O.*, 1904, No. 4.

227. HERZFELD. The treatment of granular and lateral pharyngitis. *M. f. O.*, 1904, No. 5.

228. BEZDEK. A case of pendulous tonsil. *Wiener klin. Wochenschr.*, No. 18, 1904.

229. FINDER. An additional case of lipoma of the palatal tonsil. *Archiv f. Laryngol.*, vol. xv., No. 11.

230. SENDZIAK. Primary carcinoma of the laryngeal tonsil. *M. f. O.*, 1904, No. 6.

231. HARLAND. A case of hemorrhage following tonsillotomy. *The Laryngoscope*, May, 1904.
232. WRIGHT. Autoclasis of the tonsils, an auxiliary process of their retrogression. *The Laryngoscope*, April, 1904.
233. BLACKBURN. Sore throats which present symptoms and physical signs of diphtheria. *Amer. Medicine*, May 14, 1904.
234. SPRATT. An improved snare for the removal of the faucial tonsil. *Amer. Medicine*, Jan. 30, 1904.
235. BROWN. A case of exfoliation of the anterior arch of the atlas. *Jour. Amer. Med. Assoc.*, March 12, 1904.
236. DAVIS. A case of angina Ludovici. *Amer. Jour. Med. Science*, Feb., 1904.
237. JARECKY. Hemorrhage after tonsillotomy; its general consideration. *Med. Record*, April 30, 1904.
238. RUPP. Pipe-smokers' ulcers of the hard palate. *The Laryngoscope*, March, 1904.
239. RENNER. Tertiary syphilis of the nose and pharynx. *N. Y. Med. Jour. and Phila. Med. Jour.*, Feb. 27 to March 19, 1904.
240. OHLS. A pharyngo-laryngeal tumor. *The Laryngoscope*, Jan., 1904.
241. SMITH. Alarming hemorrhage following tonsillotomy. *The Laryngoscope*, Feb., 1904.

226. A report of two cases of tuberculosis of the soft palate, of which the first, occurring with simultaneous pulmonary tuberculosis in the last stages of phthisis, is not very unusual, while the second showed the unusual condition of a perforation of the soft palate, and is also striking because, with the aid of cauterization, curetting, and the application of 80 % lactic acid, a relatively favorable result was obtained. PIFFL.

227. The author describes a method of removing the lateral edges and the granula on the posterior pharyngeal wall, which he had described ten years ago. He objects to the angular scissors, and prefers a curette-like instrument with straight branches. PIFFL.

228. A girl, sixteen years of age, suffered for three years from pain in the neck, dysphagia, and the sensation of a foreign body in the throat. The tumor was removed with a galvano-cautery snare. Histologically it proved to consist of atrophic-tonsil tissue. WANNER.

229. A woman, forty-three years of age, presented, directly behind the right palatal tonsil, a tumor as large as the terminal phalanx of the little finger. This was removed with a tonsillotome. Examination revealed fatty tissue, connective tissue, and

lymphatic tissue. Examination with a probe showed the origin of the tumor not to be the tonsil, but the supratonsillar fossa.

ALBANUS.

230. A man, sixty-two years of age, who had had lues, suffered from an ulcerating tumor at the base of the tongue, which was not examined microscopically, and consequently cannot be regarded as a carcinoma of the lingual tonsil, as the author suggests. The reviewer observed, four years ago, a similar tumor in an old man, which examination proved to be a glandular carcinoma. The development from the tissue of the lingual tonsil could, therefore, not be confirmed.

PIFFL.

231. In a girl, aged fourteen years, removal of the left large fibrous tonsil was attempted with a Matthieu tonsillotome, the blades of which cut only partly through. HARLAND severed it completely with a pair of scissors. The right tonsil was then readily removed. Profuse bleeding began immediately, and was stopped by pressure with the thumb upon the upper part of the left tonsil. After removal of the thumb, the bleeding started again; after two hours of pressure, the Paquelin cautery completely seared the upper part of the tonsil. No recurrence took place.

M. TOEPLITZ.

232. Many cases reported as papilloma of the tonsil and as so-called supernumerary tonsil are the manifestations of a stage of tonsillar retrogression. The growths of the tonsil, appearing as papillomata, are, according to WRIGHT, exceptional examples of an auxiliary process called autoclasia. The papillary excrescences on the walls of dilated lacunæ are the result of a degenerative rather than of a proliferative process. The narrow bridges of tissue consist only of brittle epithelium. The lymph channels are closing, the fibrous tissue is slowly disappearing, because of lack of nourishment. The keratosis and fibrosis disappear when the lymph channels begin to collapse.

M. TOEPLITZ.

233. BLACKBURN has seen three cases, two of true diphtheria, one of staphylococcic infection. In one case, a woman, the culture showed a pure growth of streptococci. The membrane disappeared on the fourth day, but the temperature remained intermittent between 96.2° and 105.2° F., and a series of chills and sweats, irregular, ten in all, occurred. Numerous abscesses appeared in both tonsils. The kidneys were also affected.

M. TOEPLITZ.

234. For the removal of the faucial tonsils in the adult, SPRATT recommends a snare ending in a ring with an oval fenestrum. The wire loop rests in a groove in the ring and is not exposed until the slide on the handle is pulled. A screw wheel brings sufficient tension on the wire to cut through very fibrous tonsils.

M. TOEPLITZ.

235. A man, thirty years old, carried his head and shoulders rigidly immovable, complaining of severe pain in the throat and muscles of the neck. An angry ulcer, oval, 1 cm long, appeared on the posterior wall of the pharynx a little above the level of the soft palate with profuse purulent discharge and intense inflammation around it. The ulcer began four months after the primary chancre. He slept six weeks in a chair. After energetic antisymphilitic treatment, a year after the first lesion, nearly the entire anterior arch of the atlas separated itself, and a few days later a small piece of bone, shaped like a finger nail, the articular facet from the anterior face of the pin of the axis, was hawked up. The ulcer then quickly healed. The motion of rotation was limited to about one half, but it increased somewhat during later years. Only five cases of syphilitic exfoliation of parts of the atlas or axis have been reported. All recovered, while some eighty cases of caries and necrosis of these bones due to tuberculosis ended fatally with a few exceptions.

M. TOEPLITZ.

236. A male, aged twenty, had a bad tooth in the right lower jaw for some time. A week previous to the first visit, the neck began to swell and later rapidly increased, the jaws being unable to part more than a centimetre; the tongue was thick. The swelling of the neck extended from the zygoma to the clavicle and sternum, and from the edge of the M. trapezius to the median line. Stertorous breathing, dysphagia, talk in whisper. Upon incision in line of the anterior edge of the M. sternocleido-mastoideus, only a few drops of pus escaped. Two rubber drainage tubes were passed parallel to the jaw. A culture showed virulent streptococci. More discharge on the second day and entire relief on the fifth day after operation.

M. TOEPLITZ.

237. The number of post-operative hemorrhages reported up to date is 175, among which were two authentic fatal cases. JARECKY observed a severe hemorrhage in a young man, aged

twenty-one, whose tonsils had been removed under anæsthesia, which was controlled after nine hours with the Mikulicz-Stoerk tonsil hemostat. The hemophilia was not conceded until after the operation. Hemorrhages occur also after other causes and all methods of operation.

M. TOEPLITZ.

238. RUPP observed two cases of ulcer of the hard palate due to pipe-smoking, one in a clergyman, æt. fifty, irregular, elliptical, opposite the second molar tooth, $\frac{1}{4}$ " long, a little less wide to the right of the middle line of the right half of the hard palate. The floor of the ulcer was clean, grayish-white of fibrous consistency; the edges red and vascular, readily bleeding. The surrounding mucous membrane was œdematous, smoky. The ulcer was produced by a briarwood pipe. The other ulcer occurred in a mason, æt. fifty-three, smoking a stub of a clay pipe all day long. The ulcer was opposite the right canine tooth, of half the size of the first, circular. Discontinuation of smoking and hygienic and local treatment healed the ulcer.

M. TOEPLITZ.

239. RENNER gives a full and elaborate account of tertiary syphilis of the nose and pharynx, which also contains some observations of his own: Case 1, lupus syphiliticus. Flat, glistening scar of the right upper lip, extending into the nose to perforation of cartilaginous portion of septum. Tip indurated, small portion of right ala destroyed with the induration around. Cases 2 to 6 were infiltrations of the nasal mucous membrane resembling hypertrophic rhinitis, or where the infiltration was partly broken down with superficial ulceration. In several cases operations were performed without avail, and the diagnosis of syphilis was not made until other lesions appeared. Anti-syphilitic treatment then effected a cure.

M. TOEPLITZ.

240. A man, æt. twenty-nine and a half, had, at the age of four, a growth on the left side of the neck, leaving after removal a large mass of scar tissue adherent to the fascia and interfering with the rotation of the head. Until the eighth year he was subject to severe attacks of croup. In 1888 the uvula and left tonsil were removed. Previous to that he had difficulty in swallowing, which gradually increased even later. Dyspnœa occurred but once, after a run. Several tubercular glands were removed and the subcutaneous adhesions loosened; a hernia of cirrhotic lung tissue was discovered in the field of operation. He threw the

diate operation was advised, and the patient was admitted to the New York Eye and Ear Infirmary.

The case was put on the operating table and chloroform was administered for the reason that some coarse bronchial râles were present.

Operation on Right Ear.—The usual curvilinear incision was made, and after the periosteum had been reflected the bone was exposed. The cortex was found to be discolored and a small perforation had taken place over the antrum. The probe introduced through this perforation passed forward, upward, and inward into the middle ear, while downward it extended to a large cavity toward the tip. The necrotic cortex was curetted away and exposed a cavity filled with foetid pus and granulations. The diseased area ran so far backward and upward that the curvilinear incision did not give sufficient exposure, and a horizontal incision from the posterior flap of the wound backward an inch and a half was necessary. The mastoid tip was ablated with rongeur forceps, and on removing the bone deep down the lateral sinus was uncovered at the knee for a space of more than one inch before sound bone was encountered. The dura was also uncovered just above the antrum. The aditus was thoroughly curetted, and in exploring the superior wall the probe led into the deep zygomatic cells. Again it was necessary to prolong the curvilinear incision forward an inch and a half toward the external canthus to expose the zygomatic cells. After the temporal muscle had been elevated from its position upward, the zygomatic cells were broken down by rongeur and curette.

These cells were filled with pus and were extremely large, one cell apparently leading into another. So much destruction was present here that the entire posterior zygomatic root was honey-combed and it was necessary to ablate it.

After the large cavity formed by the removal of necrotic bone had been thoroughly curetted and cleansed, a temporary light dressing was applied. Necessary steps were then taken for the—

Operation on Left Ear.—The usual mastoid incision was also made on the left side, and the usual mastoid operation was done. The cortex was very thin and the bone destruction was so great that a horizontal incision and a curvilinear incision forward for a distance of an inch and a half was necessary before the parts were finally exposed enough to complete the operation.

On the left side the sinus and dura were also exposed in about



TO ILLUSTRATE DR. BRANDEGEE'S CASE OF ACUTE MASTOIDITIS WITH
EXTENSIVE INVOLVEMENT OF THE ZYGOMATIC CELLS.

the same position as on the right side, while ablation of the zygomatic cells at the posterior root was necessary. After the large cavity was curetted and cleansed, both wounds were packed with iodoform gauze and the patient returned to the ward.

The time of the operation was two hours, but the depth and extent of the invasion necessitated very careful dissection.

It is interesting to note that the pus taken from both wounds at the time of the operation showed pure culture of streptococci with a few pneumococci, and that the blood count, while showing a mild leucocytosis, gave a polynuclear percentage of 84.

The involvement of the zygomatic cells in this case was the most extensive that the operator has ever seen, and the surprising rapidity of the infection seemed most remarkable.

The accompanying photograph, taken three weeks after the operation, gives a fair idea of the depth and extent of the wound.

Five days after operation, the condition of the patient was complicated by pneumonia, which involved the infrascapular region posteriorly in both right and left lungs. This pneumonia fortunately ran a rather mild course, consolidation diminishing in about nine days, while resolution was complete in about seven days more.

The temperature, when the patient was admitted to the hospital was 104° F., and arose the second day after the operation to its highest point, 105½° F., but, after the resolution of the pneumonia took place, gradually fell to normal. The boy made an absolutely uneventful recovery, and was dismissed from the hospital four weeks after the operation. Despite the enormous size of the wounds, there is but little deformity on either side, while the hearing has not been disturbed.

SECONDARY ANÆSTHESIA HEMIPLEGIA AS A COMPLICATION OF THE MASTOID OPERATION.

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ATTENTION has been called by Garrigues,¹ Büdinger,² Krumm,³ and others to cases of what they term anæsthesia paralysis. In such cases paralysis of arm, leg, etc., has followed the administration of an anæsthetic—being hysterical, or due to central, reflex, or peripheral causes.⁴ The following case of hemiplegia is interesting because it adds another to the small list of cases of central anæsthesia paralysis, and because, occurring as a complication of the mastoid operation, it was at first glance thought to be due to cerebral abscess. It is probable the middle cerebral vessels were injured during instrumental delivery at birth, and the consequent paralysis, latent for years, was made evident and deepened by circulatory changes incident to prolonged etherization during mastoid operation.

Leo B., a school-boy of eight years of age, entered the Presbyterian Hospital, February 12, 1904, and was operated upon next day for abscess of left mastoid. History given at that time was meagre—he had had discharge from both ears since an attack of scarlet-fever four years before, and in the preceding June inflammation of left ear had led the attending physicians to make an incision down to the bone back of the auricle, which measure had relieved the child.

When first seen the boy looked rather fat and phlegmatic, and not particularly ill. There was considerable purulent discharge

from both ears; the left auricle was pressed out by the swelling over the mastoid, and there was much local pain and tenderness in this region. Respirations were 24; pulse was 120; temperature $99\frac{1}{4}^{\circ}$ F. February 13th, under ether, incision was made back of auricle through tissues infiltrated with discharge from a small opening in the mastoid process. The mastoid was found riddled with foul pus, necessitating extensive curettement, in the course of which the lateral sinus was uncovered for half an inch, but not disturbed. The roof of the middle ear was left intact. Tympanum, antrum, and mastoid cells were cleared into one large cavity; the operation lasting one hour, and patient standing it very well. The wound was freely drained with gauze and dressed in the usual manner. The boy came out from under the anæsthetic in a perfectly natural way, and presented nothing unusual, except that for about five days his stomach would not retain nourishment, and it was noticed that there was considerable loss of power in the left arm and leg, together with some paralysis (?) of mouth and face, the exact nature of which was obscure. Temperature ranged from $97\frac{1}{4}^{\circ}$ to $100\frac{1}{4}^{\circ}$; pulse from 102 to 140; respiration from 20 to 26; all coming to about normal by February 17th. A careful examination of the heart proved it to be entirely normal. The eye-grounds and muscles, examined by Dr. William T. Shoemaker, were found normal. The boy's mental condition was good—he was not irritable, nor had he marked headache. By accident, urine for specimen before operation was voided at stool. Urine, February 13th, gave evidence of kidney disturbance: Sp. gr. 1.038, acid, amber yellow, albumen moderate amount, some hyaline and granular casts, a few epithelial cells and leucocytes. February 24th: 1.026, trace albumen, hyaline and granular casts, mucus, few crystals cerium oxalate. Blood was not examined. Strych. sulph. gr. $\frac{1}{16}$ every four hours was given when pulse went above 120, and the boy was kept in bed; later potass. iodid. was given in increasing doses for a few weeks, beginning with gr. 3 t. i. d. Electricity was applied to arm and leg. The wound was dressed on February 16th, and every day thereafter. The patient was able to get up February 23d, and went home March 5th. Respiration at that time 20, pulse 72, temperature $98\frac{1}{4}^{\circ}$.

The occurrence of left hemiplegia after operation on left mastoid was puzzling, and at first unexplainable. It was

evidently cerebral and due to lesion limited to the right motor area; syphilis, embolism, apoplexy, and cerebral abscess, the last especially, were carefully considered as possible causes. An examination of the muscles and nervous system, made by Dr. T. H. Weisenberg, seemed to prove what had not been suspected, namely, that hemiplegia in latent form had antedated operation. The notes of this examination are as follows:

"After the mastoid operation, it was noticed when the boy talked the mouth was moved more than usual and the face was drawn to the left (?), also that his left arm was stiff and could not be used as well as before. The mother is positive that before operation the boy had no paralysis.

"Examination shows typical gait of hemiplegia. The left upper and lower limbs are spastic and held rigidly to the side and are contractured. Grip of left hand is weak compared with right; resistance to passive motion is diminished at left elbow and left knee. The left lower limb measures less than the right, the difference being about half an inch above the knee. There is also a difference in the measurements of the upper limbs, the left forearm and arm being distinctly smaller in size than the right. All tendon reflexes in the left upper and lower limbs are increased. Ankle clonus is not obtained, but plantar irritation produced distinct extension of the big toe. Sensation is not altered. The lower distribution of the left seventh nerve is paretic, the upper distribution being normal. The pupils are equal and respond promptly to light, accommodation, and convergence. The extraocular movements are normal. The tongue protrudes straight, there being no tremor nor atrophy. The patient has not complained of headache, though for a day or two he had nausea and vomited. The electrical reactions are normal. The right side shows no pathological conditions. Subsequent examinations showed no alterations. There is present, therefore, a typical left hemiplegia, which must have been of long duration to have caused the atrophy of the left arm and left leg, as such atrophy certainly could not have occurred in the short time that had elapsed since operation."

Careful questioning elicited the following previous history, which makes it possible to assign a cause for the primary hemiplegia :

Family history is good ; all members of three living generations are in good health, and have never had any serious diseases, except the boy's father, who had typhoid fever. The mother had a miscarriage after Leo was born, but afterwards had a healthy child ; another older child is perfectly healthy. She had a miscarriage again a year ago.

When the boy was born, forceps were used, and when he began to walk, at one and a half years of age, it was noticed that his left foot turned inwards. His left leg has been somewhat weaker than the right, but no importance was attached to this. Ever since an attack of scarlet-fever, at the age of five, the boy has had difficulty in speaking, screwing up his mouth and twisting it as he talked ; the fever kept him in bed six weeks, and was followed by an attack of rheumatism. The fever also started a purulent discharge from both ears, that ended in an attack of mastoiditis in June, 1903, as we have seen, and in February, 1904, the complete mastoid operation was performed, followed by the appearance of an unmistakable hemiplegia.

A consideration of the etiology, with the above information in hand, made the following conclusions seem most reasonable.

Syphilis could hardly have caused such marked hemiplegia so abruptly, and there were no other evidences of specific disease, except possibly in the history of miscarriages.

Embolism would not likely occur in the right motor area from operation on left mastoid ; there was no valvular disease nor other point of origin for the embolus. Then, too, there were no convulsions, headache, nor period of unconsciousness, nor marked fever.

Cerebral abscess of one side from ear lesion on the other side, though rare, does occur. Politzer* refers to cases of this kind (reported by v. Trölsch, Magnus, and others), regarded by him as cases of pyæmic metastasis. Mills had such a case, the abscess being found, upon operation, in the

right motor area, although the left ear was probably the source of infection. But there would be other symptoms besides the loss of power: headache, mental disturbances, and perhaps optic-nerve changes, with general asthenia—symptoms absent in this case.

It might be thought possible that brain abscess on the right side had developed slowly from the right ear discharge, and that a prolonged operation had favored its increase, making its presence more evident. Dench^{*} refers particularly to the possibility of brain abscesses remaining latent in this way. On the other hand, abscesses of otitic origin very rarely affect the motor area, and, in any event, would produce general asthenia, somnolence, headache, and possibly a slow pulse.

Apoplexy sufficient to cause hemiplegia might occur during prolonged etherization, though very few cases have been reported.⁷ This attack would be accompanied by marked symptoms, such as unconsciousness, stertorous respiration, slow, full pulse, and by febrile reaction. There would be no immediate wasting of the paralyzed limbs.⁸ As the first were lacking, and wasting was present, it is evident that primary apoplexy was not the cause of hemiplegia in the case under discussion.

Neither was it a case of pressure paralysis, for such cases are characterized by sensory disturbances as well as by loss of power. These disturbances may be represented by tingling and numbness, or be limited to sensitive points found by pressure along the course of the nerve involved; the electric excitability of the limb is diminished and the muscles contract slowly; ordinarily the arm only is affected.

Assuming that hemiplegia antedated operation, we find in forceps delivery a satisfactory cause for the condition. Hemorrhage from a middle meningeal or middle cerebral vessel could cause hemiplegia, evidences of which might largely disappear before the child began to walk at one and a half years of age. Atrophy of the cortex, leading to wasting of the limbs, would occur, and the resulting slight weakness of the leg and arm might not be noticed if situated on the left side. Hemorrhage from the middle

meningeal would probably be absorbed, leaving only a slightly thickened dura, or possibly a cyst. If a middle cerebral vessel were affected, on the other hand, a condition similar to embolism would be produced. The blood supply to the cortex beyond would be lessened, some atrophy and softening of the brain at that part would take place, and the nerve cells, which later recovered and took charge of the innervation of the affected arm and leg, would be weaker and less stable than normal.

Supposing then a hemiplegia caused at birth by forceps, what condition during mastoid operation could account for the return of hemiplegia? There is certainly nothing in the operation itself to account for it, and the only other probable factors are the anæsthetic and the renal disease. These might be deemed capable of producing it by affecting the blood pressure and blood supply, or by toxic action. It is easy to believe that a second hemorrhage might be induced in a person *with diseased arteries* by the disturbance of circulation attending a protracted operation under ether, though comparatively few cases are recorded. Surgeons are seldom called upon to operate upon hemiplegics under anæsthetics; replies to letters addressed to three surgeons of large experience are to the effect that they have had practically no cases of the kind. Hewitt' tells of a case in the London Hospital, an elderly man, who had an apoplexy while under ether. It was learned afterwards that he had had a previous apoplectic seizure, with complete recovery. Such a case can be readily understood, but it is not easy to imagine how hemorrhage would recur in a child *with normal arteries*, at the site of former lesion, especially if previous bleeding had originated from a middle meningeal vessel. The scar present would be even less liable to bleed than normal tissue, for it must be borne in mind that anæsthetics lower blood pressure after the first slight momentary rise, nor would toxic substances have any more effect upon the old lesion than upon other parts of the brain.

One conclusion, a theory suggested by Dr. Charles W. Burr, is left, and that seems to cover the conditions present. If thrombosis or embolism of a branch of the middle cere-

bral artery occurred at birth from injury by forceps, there would have resulted an ischæmia of the cortex supplied by the vessel; partial atrophy and softening of that segment of the brain would occur with a gradual wasting of the muscles of the limbs affected. After absorption of adventitious elements, some renewal of circulation would take place in the diseased part of the brain, slight in quantity perhaps, but sufficient to restore some degree of functional power to it. Afterward any marked weakening in blood pressure or cardiac power would materially lessen the blood supply of the part of the brain that had previously suffered, entailing loss of function until circulation was again established. It is possible, too, that the equilibrium of the partly degenerated cells, or of cells that had taken upon them extra duty, might be readily overturned by the presence of toxic poisons normally excreted by the kidneys, or by the lateral action of the anæsthetic, though these factors would probably not be important.

The speech defect probably dated from scarlet-fever, and was not caused by mastoid operation. The boy is right-handed. The slight facial palsy was very likely due to the old cerebral condition and involved the lower part of the left side of the face.

The theory advanced above was strengthened by the subsequent history of the boy. After mastoid operation, when the boy had been about for some weeks, great improvement in the paralysis was noted—he could put his hand to his head, and walked about easily though awkwardly, *i. e.*, the left foot dragged and the left arm hung stiffly at his side. The toe, in walking, made a semicircular swing (cerebral gait), and the affected muscles were somewhat spastic. The left ear and mastoid wound continued to discharge foul pus, and the right ear muco-pus. As the latter did not improve, the pharyngeal tonsil, much enlarged, was removed under ethyl chloride general anæsthesia. This was on March 11, 1904; hemiplegia was notably worse immediately after this operation, but became less again in a few days. Respirations during this period ran from 20 to 24; pulse, 94 to 108; temperature, $97\frac{1}{4}^{\circ}$ to $99\frac{1}{4}^{\circ}$ F., being down in the morning (pus

absorption). Eyes were again examined with negative results: media clear, disks well defined, vessels normal. The right ear markedly improved after removal of adenoids. May 21st, under chloroform, the left mastoid was rapidly curetted and a piece of necrosed cartilage from auditory canal removed. After operation, hemiplegia was again increased, subsiding in a short time. Urine, May 20th: 1.032, acid; amber-yellow, flocculent sediment; trace albumen, no casts, a few epithelia, no leucocytes, some uric-acid crystals. May 24th: 1.025; fine sediment; ammonium-urates—otherwise same as 20th. Odor from wound and discharge ceased, and the sinus healed up, though both ears still discharge a little. The boy has improved in health. He can run and use his arms and legs for ordinary purposes, but there is still much awkwardness. Further improvement is not expected.

The temporary deepening of hemiplegia after the different anæsthetics seems to prove the correctness of the theory advanced. Had the lesion existed upon the left side of the brain, it might very easily have been mistaken for cerebral abscess and led to exploratory operation. A careful study would have prevented such an error, and this report stands as a plea for careful study in all such complications. I owe much to Dr. B. Alex. Randall, Dr. Keen, and to many others who have aided me in investigating the case.

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ON THE OPERATIVE TREATMENT OF INFECTIVE SIGMOID-SINUS THROMBOSIS.¹

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THE following paper is based upon the observation of forty-four consecutive operations for infective sigmoid-sinus thrombosis of otitic origin. Of this number the writer has performed fifteen. The remainder have been operated upon by different surgeons. These cases embrace a great variety of pathological conditions and represent various stages of the disease.

The method of handling these cases and the technique employed have varied with the individual operator, and a comparison of the respective methods has been afforded. The following conclusions and such divergence from the usual technique as is herein advocated have arisen from a survey of the foregoing. An attempt at an orderly and minute description of the sinus operation has not been made; merely certain points have been brought up for discussion. Such of the writer's cases as serve to illustrate the points in question will appear later as a separate paper.

As infective sigmoid-sinus thrombosis of otitic origin is with rare exception secondary to mastoid involvement, the exploration of the mastoid and the removal of its septic foci constitute the primary step of the sinus operation, and we approach the sinus through the mastoid wound after having exposed its overlying bony groove.

¹ Read in part before the Otological Section of the New York Academy of Medicine, April 13, 1905.

We should work as rapidly as possible, remembering that before the operation is concluded the patient may be overtaken by a degree of shock which necessitates an abrupt termination of the procedures. It may be necessary to explore the brain, to resect the jugular, or both; the sacrifice of time is a tremendous handicap for the patient, and rapidity in operating is at a premium. It should be our aim to do everything which we have to do, *i. e.*, to deal with all intracranial complications, at the time of the original operation, for it soon becomes apparent to those who see many of these cases that a peculiar fatality hovers over those patients who for the second time are subjected to operative interference; not that the second operation in itself so greatly adds to the gravity of the case or unfavorably influences the outcome, but it argues the error of delay when the intracranial sinuses are invaded by the micro-organisms of suppuration. We cannot do the sinus operation to-day, the jugular resection to-morrow, and get good results.

Exposure of the Sinus.—As a rule, but by no means always, we find in these infected thromboses that the septic process has extended from the mastoid by contiguity, that the overlying sinus groove has been eroded, and that this solution of continuity in the bone is the gateway through which infection has proceeded. During this quiescent period of invasion, which covers an extremely variable time limit, the dura constituting the external sinus wall frequently undergoes a slow inflammatory change and is soldered by a limiting pachymeningitis to the circumference of this hiatus at a greater or less distance from its irregular border. This opening offers an inviting point from which to commence the removal of the remaining sinus groove, but if possible we should avoid it. For it is here that the vessel is most likely to be injured; it is cemented to the sinus groove, and in our effort to separate the soft, friable, blood-soaked wall, it is easily torn. To control hemorrhage which may occur we must exert pressure at the very point at which the thrombus is most likely to be, and this mashing of the contained clot is as far as possible to be avoided. For we not infrequently see particles of a thrombus so loosely clinging to

the mass that but little manipulation would be necessary to set them loose and force them into the general circulation.

When the conditions are favorable we should expose the sinus at a point as low down and as near the bulb as is convenient for work, in the hope that the thrombosis is not so extensive as to have involved the entire vertical limb, and that the vessel at this point is not invaded. If we find the sinus wall near the bulb to be healthy and the vessel's lumen seems filled with blood, a compression plug should be placed across the vein at this point to block any particles which by chance may be detached from the clot in our endeavor to remove the remaining sinus groove, during which time the sinus and its contents suffer more or less manipulation.

If during an operation we take note of the squeezing and pressure to which these sinuses are subjected in our attempts to expose them, we find this to be considerable, and while the degree of danger which we thus incur is problematical, we should make every effort to avoid unnecessary manipulation.

As an instrument with which to expose a sinus the chisel is an excellent one. While it has been claimed that we run a greater risk of injuring the vessel with it than with other instruments, there are other factors which enter as elements of danger in these cases which the chisel particularly avoids.

When removing the sinus groove with the chisel the vessel suffers but little disturbance, for the chisel is held nearly parallel to its course, and the resulting concussion radiates out into the bony arch which spans the sinus, and is not expended upon the vessel and its contents. The amount of disturbance thus occasioned the vessel and its clot is not to be compared with that which follows the use of the rongeur, for as the blade of this instrument is placed between the sinus and its overlying groove, the vessel is continually depressed and squeezed, and its contents are subjected with each bite of the forceps to considerable sudden manipulation. Should the thrombus be in a condition of disintegration, or should it be a partial clot, the danger of distributing septic emboli should not be considered as remote.

The rongeur as a desirable instrument with which to re-

move the overlying groove gains its safety in view of the fact that the broad beak of the instrument placed between the bone and the dura of the sinus depresses the vessel from its groove—safety gained at the expense of manipulation. In an uninvolved sinus this fact need not be considered, but when this vessel has become the recipient of a septic clot (the physical condition of which we are not certain until we have opened the vein) the disadvantages of the rongeur are apparent. If after exposing the lowest accessible portion of the sinus the examination points to its non-involvement, by placing a small compression plug across the vein we lessen the danger of disseminating septic particles with the rongeur. If it is evident that the vein is thrombosed at this point, or that the thrombus is in a condition of disintegration, we should resort to a jugular resection without making further attempt to uncover the sinus. If we are uncertain of thrombosis at this point, the compression plug should not be placed, but we should proceed to uncover the sinus throughout its entire area of involvement.

In exposing the sinus we should remove all diseased bone. If the involved dura is not now encircled by a good border of healthy membrane, the removal of healthy bone overlying the diseased dura should be continued until a strip of healthy membrane completely surrounds the involved area. If sufficient room for free manipulation is not now secured the sinus groove is removed until the requisite space is obtained.

It is difficult to state exactly the length of sinus which in all cases should be exposed, nor can we be governed by any arbitrary rule. The important indications to be met are:

1. Healthy sinus wall should be reached on both the torcular and bulb sides of the involved area. In some instances of extensive involvement the pachymeningitis extends so far down toward the bulb that we do not reach its lower limit.
2. The area of exposure should be sufficient not to hinder the manipulation.
3. It should embrace that portion of the sinus into which

empties the emissary vein, for this vessel may enter as a factor of error in judging the return flow.

4. In those instances in which the symptoms of sinus thrombosis are present, in which after opening the sinus we find it uninvolved and being unable to account upon other grounds for the symptoms present, we should expose sufficient of the sinus to allow the exploration of both the jugular bulb and the superior petrosal sinus. The amount of bone necessary to be removed for this is but slightly more than that which must be removed in order to obtain a free manipulation of the vein. It does not add to the gravity of the case, and the advantage to be gained in doubtful cases is supreme.

The Diagnosis of Thrombosis after Exposure of the Sinus.—While in many instances it is apparent that the vessel is invaded by a thrombus, experience has certainly taught us that the appearance and the "feel" of a sinus do not necessarily indicate what is within it.

When operating upon cases of mastoiditis in which symptoms of septic absorption pointing to sinus thrombosis are present, we will find it to be a conservative practice to open the vessel *regardless of its appearance, of its feel, or of its pulsation*; or again, if during the mastoid operation we expose a sinus which upon careful examination seems suspicious we should open the vessel *regardless of the lack of symptoms*. We have not sufficiently awakened to the insidious and formidable character of this disease, nor to the fact that in the earlier stages of sinus thrombosis the disease is silent and does not manifest itself through symptoms indicative of its presence — chill, remitting temperature, and sweat, while not infrequently the earliest symptoms through which the disease announces its presence must, in the light of their pathological import, insomuch as they signify clot disintegration and not thrombus formation, be regarded as late manifestations proclaiming the advent of sepsis. Only by opening the sinus can we definitely acquaint ourselves with the conditions, and in this disease an error in diagnosis or a delay in operating too often means a fatality by leaving the question to chance.

If we follow this practice we will undoubtedly open many sinuses which are not invaded ; but, considering the number of vessels opened, ill results so seldom follow that this cannot be considered an accident, the gravity of which is often realized, unless the wound at the time of vessel injury harbors fluid pus or has not been cleansed. When proper cleansing has been instituted I have never seen an ill result follow from opening the vessel, and I have seen a sufficient number of sinuses opened under these conditions to feel confident that the danger is remote as compared to the danger which we incur by leaving these vessels which we suspect to contain thrombi unexplored. Unless we open these sinuses we will often leave thrombi within them, the presence of which we never know until the disease later announces itself through symptoms ; this then too often is too late.

When sinus thrombosis has passed into that stage where it manifests itself through symptoms indicative of sepsis it has then become formidable, and a large portion of these cases die regardless of surgical interference. It is imperative that we do not remain in doubt as to the vein's involvement. In the great majority of cases which the writer has observed it has not been known before opening the vessel whether a thrombus was or was not present. We have seen a sufficient number of fatalities follow the expectant plan, in which, though the sinus seemed suspicious, on examination the patient was returned to bed to await development, to feel that this represents a false and dangerous conservatism ; when the symptoms do appear they not infrequently are those of lepto-meningitis, the extension to the endocranial lymph sac having proceeded from the infective thrombophlebitis. Unless we open the vessel the following are errors which we cannot avoid :

1. An obstructing thrombus may exist in the lower inaccessible portion of the sigmoid or in the vicinity of the jugular bulb, and the sinus throughout its area of exposure may be absolutely non-indicative of the presence of thrombosis ; unless we open the vessel upon the symptoms we have no reliable means of determining the presence of the clot.

2. A parietal thrombus may be present which eludes detection. If granulations invest the vessel it is generally impossible to determine whether the resistance encountered upon palpation, and that which we attribute to a thrombus within, is due to a thrombus within or to the thickened vessel wall and the granulations without. A positive diagnosis of parietal thrombus is rarely made before the sinus is opened. If after a careful examination of the vessel (taking into consideration its appearance, feel, color, etc.) we are in doubt as to the presence of a thrombus the vein should be opened regardless of the lack of symptoms.

3. While it is true that a large portion of completely obstructive thrombi is easily recognized before opening the sinus, there are cases in which the thrombus completely blocks the vessel and yet escapes detection. Particularly is the diagnosis difficult if the external sinus wall is covered by thick exuberant granulations, as it frequently is, if the vessel wall be thickened by a long standing and slowly invading process, or the thrombus be of that liver-colored appearance and jelly-like consistency which represents a recent clot. These thrombi are often impossible to detect unless the vessel is opened, and I have repeatedly seen these cases pass unnoticed until the disintegration of the thrombus was later announced by symptoms. I have myself twice made the error in cases of completely obstructing thrombi in which there was an absence of symptoms—once with a fatal result. To claim that we can easily recognize a completely obstructing clot without opening the vessel is to claim what in a large portion of these cases we actually cannot do.

A difficulty in diagnosing the condition often is that a completely obstructing thrombus blocks a given portion of the sinus; from either the cardiac or torcular end of the obstructing clot there extends for a variable distance up or down a partially obstructive clot, and this parietal thrombus in turn gradually passes into a portion of the vessel which is absolutely patent and unobstructed; there may be no sharp jump from completely obstructing thrombus to normal unobstructed vessel, and a comparison between any two consecutive portions of the vein may offer no marked contrast.

If, in addition, the parietal wall of the vein is covered by an uneven layer of exuberant granulations, the problem of definitely determining the presence or absence of a thrombus is beyond our diagnostic ability. While the obstructing thrombus may occupy only a small portion of the vessel, the partial thrombus may involve the entire length of the remaining lateral or sigmoid sinus, and it may be here added that these incompletely obstructive thrombi constitute one of the most dangerous class of cases.

While the appearance and the feel of a sinus frequently give positive evidence as to the presence of a thrombus, they not only are often valueless in bringing us to a definite conclusion as to the vein's involvement, but are altogether misleading. There are some who lay such stress upon the discoloration of the sinus as to look upon it as an index of the condition within the vein, but of all factors that are of diagnostic value, this one taken by itself is the most fickle. When we consider the pathology of sinus discoloration we are forced to admit that the factors responsible for it need have no influence upon nor relation to the condition of the vein's interior, and such unbounded confidence in this one sign as we sometimes hear expressed is not well founded. Pulsation of the vessel or the absence of pulsation is of little value in diagnosis. As a diagnostic instrument, an aspirating needle is worse than useless; not only is it untrustworthy but it is dangerous.

An experiment which may be of some value in certain cases in determining the presence of a thrombus in the vicinity of the bulb prior to opening the vein has been brought forward by Whiting, of this city, and later by Meier, of Germany, and designated by the former author the "expression experiment." It is thus described: "The index finger is placed across the sinus at the bulb with sufficient firmness to cause obstructive pressure of the walls at this point. The other index finger is then placed close beside the first and, with a stroking, stripping movement, carried steadily along the course of the sinus toward the torcular as far as the knee, at which point the finger rests with firm pressure. An assistant now makes firm

pressure upon the jugular vein low down in the neck, so that the backward pressure of the blood current toward the bulb may be as much as possible augmented. It is now obvious that in case no obstructing thrombus existed in the vein or sinus the collapsed walls of the latter would be immediately distended with blood upon removing the pressure of either finger."

While in certain instances this procedure may assist in deciding the diagnosis for us, I feel that we should not rely upon any measure short of opening the vessel when we are in doubt as to its involvement; for when we come to a consideration of the anatomy of the region of the jugular bulb we find that the factors which invalidate this experiment (intended as it is to detect a thrombus in or below the jugular bulb) are numerous.

1. In the case of incompletely obstructing thrombi, as has been stated, the experiment is inapplicable; at the same time we may gain nothing from a diagnostic point by opening the vein; the thrombus may not be sufficiently large to noticeably affect the volume of the return current. I think, however, we place ourselves in a more certain position to judge of the vessel's patency by opening it, for as the degree of obstruction increases it will manifest itself sooner by a visible decrease in the return flow than by any noticeable failure to fill an unopened vein. If the vessel is covered by granulations and has become thickened it tends to maintain its patency as the fingers in this experiment become separated, and as the gush of blood refills the lumen, the thickened, non-resilient parietal wall does not belly out with sufficient suddenness, nor to a sufficient extent, for us to notice the occurrence of the phenomenon; it fills as a rigid tube, expressionless.

2. If a thrombus is below the jugular bulb, blocking the upper portion of the jugular vein, no matter whether the thrombus be partially or completely obstructive, a return flow from the inferior petrosal sinus and the other vessels tributary to the bulb would quickly fill the collapsed sinus and mislead us. For when the jugular vein is thrombosed, or ligated, the current in the inferior petrosal sinus (pro-

vided the bulb be also not occluded) sweeps across that reservoir, is merely diverted from its usual course, and finds exit through the posterior condylar and other tributary vessels to the bulb; if the sigmoid sinus be emptied, as in the above experiment, it, too, would soon be filled upon the release of pressure.

The posterior condylar vein, a vessel of considerable size, offers the same difficulties as does the inferior petrosal, and even though the jugular vein be blocked and the jugular bulb be blocked also, it is necessary, before the posterior condylar be eliminated as a factor of error, that the clot should extend out into the horizontal limb of the sinus beyond the mouth of this vessel.

There is another factor which enters as a source of error. The mastoid emissary vein joins the sigmoid sinus at a point which is between the points of compression. This vein varies considerably in size and not infrequently is of good calibre. It might be supposed that little bleeding would occur from this vessel into the main sinus or that the current in the emissary might be reversed under the conditions of thrombosis. We should remember, however, that the currents in veins which lack valves are only constant in direction in that they seek the path of least resistance, and that at any time these currents may reverse themselves under the conditions of disturbed circulation. As the finger strips the main sinus toward the knee it leaves behind it as it advances a vacuum of gradually increasing size, and the moment the finger passes the mouth of the emissary, the flow within the latter vessel is poured into the sinus, or if the current be from the main sinus it immediately reverses itself in order to follow the path of least resistance, which is into the vacuum.

If a clot completely blocks the lower portion of the vertical sinus limb, as the upper finger passes the mouth of the emissary the reversal of the current in this vein will continue until the main sinus has ceased to be the path of least resistance—*i. e.*, until the sigmoid has been filled, when the current in the emissary may again reverse itself. I have repeatedly seen a sufficient bleeding from an emissary vein into

a main sinus after the latter had been opened to be at first mistaken for a return flow coming from either above or below, supposedly due to an incomplete obliteration of the main sinus by the compression plugs; an amount of bleeding which would quickly have filled the sinus in this experiment and misled us. When we attempt this experiment we should eliminate the emissary as a factor of error. It is difficult to see how this procedure is applicable to those cases in which the thrombus is below the mouth of the posterior condylar vein.

If a thrombus is confined to the upper portion of the jugular vein and the bulb itself is uninvolved, we have no means of determining the presence of such a clot; nor would opening the sinus necessarily assist us in diagnosing this condition. The following case reported by the writer will illustrate the difficulty. We open a sinus and find a thrombus extending down into the bulb. Without disturbing this clot we expose the jugular in the neck, find its upper end completely thrombosed by extension of the clot from the sigmoid downward, and exsect the vessel. We now return to the sigmoid sinus and remove the thrombus from its bulb end, when we immediately get a copious return flow, evidently from the vessels tributary to the bulb (New York Academy of Medicine, February 9, 1905).

Had, in this case, the thrombus been confined to the jugular vein and had the bulb and the sigmoid been uninvolved, upon opening the sigmoid a copious gush would have come forth from its bulb end, and we might have inferred, but erroneously, that the jugular vein was free.

Method of Exploring the Sinus after its Exposure.—The sinus is frequently opened and explored in a manner which renders impossible the detection of a partial clot and prevents us in the case of either a partially or completely obstructive thrombus from determining the upper or lower limit of the invasion. This faulty method of procedure is one which is commonly practised; it is as follows: The flow from both above and below is blocked by the compression plugs placed on the torcular and bulb sides of the supposedly involved area. An opening is now made in the

external wall of the sinus for the introduction and manipulation of a curette. The instrument is passed into the lumen of the vessel first up toward the torcular and this end is curetted; pressure is now released on the torcular side to see if the flow from this end is copious, and if so compression is made, the upper end of the sinus is obliterated, and the hemorrhage is controlled. The curette is now introduced down toward the jugular bulb, and after a sufficient curetting of this end of the sinus pressure is released from below, and if the return flow seems sufficient compression is made and the hemorrhage from below is controlled.

It requires only a brief consideration of the pathology of sinus thrombosis and the evidence to be found upon post-mortem, to see that the above procedure is not only unthorough, but it frequently places the operator in doubt as to whether a thrombus has or has not been present—it generally leaves him uncertain as to whether the clot has been completely extruded, and the great danger of the practice lies in the fact that it does not reckon with the infected vessel as well as with the clot.

Some objections to this procedure are the following:

1. It is difficult to thoroughly curette through a small opening the interior of a blind tube, or to be certain that we have done so. If the thrombus be firmly attached to the interior of the vessel, we may fail to remove it completely; it may escape the curette, and as pressure is released the return flow may not be sufficient to detach it.

2. If the thrombus be not greatly obstructive, *i.e.*, if it be a partial thrombus, as pressure is released from either the torcular or the bulb end, the return flow which results will practically be as copious as if no thrombus were present. In other words, the freedom of a return flow does not necessarily indicate the absence of a thrombus; only when the thrombus is greatly obstructive does it diminish the return flow sufficiently for us to notice the diminution, and we can easily convince ourselves of this when having accidentally injured a normal sinus we take the trouble to obliterate its lumen by pressure gradually increased.

As the curetting is completed at the respective ends, the

instrument is withdrawn, the gush of blood occurs, we not infrequently fail to observe a clot, and we are completely at sea to know whether a thrombus has or has not been present.

3. Unless we slit the vessel freely open throughout the entire area of involvement and examine the interior of the vein, we never know that we have reached the limits of the thrombotic invasion; for while the compression plugs may have been placed at what appear to be the upper and lower limits of the vessel involvement externally, the interior of the vein may be invaded far beyond these points and a thrombus may extend beyond the compression plugs either out toward the torcular or down toward the bulb, and yet the external wall of the sinus over these areas does not indicate such extensive involvement and may appear normal in all respects. If now we curette up or down to the compression plugs and exsect that portion of the external vessel wall included between these plugs, and if the thrombi beyond these points are partial and do not greatly obstruct the vessel's lumen, we get a generous volume of blood from both the torcular and bulb ends upon the release of pressure and make the fatal error of leaving a portion of the thrombus still within the vein.

On more than one occasion I have seen a sinus opened for the introduction and manipulation of a curette, a thrombus removed, the compression plugs successively released from above and below, a good return flow from either end secured, and the intervening vessel wall exsected; the patient returned to bed, the symptoms continue, and in a few days later a second and more extensive operation done, in which the external wall of the sinus was now slit freely open both above and below so that the actual conditions within the vein could be seen; a second thrombus removed from beyond the site of the compression plug, and the firmness and consistency of which made it absolutely certain that this second clot was a portion of the first which had not been reached at the original operation, owing to the fact that the attempt had been made to carry out a manipulation through an insufficient opening, and that a return flow had been

accepted as a guaranty that the clot had been completely extruded, and that the limits of the thrombosis had been passed.

4. We may completely remove a thrombus, but if the clot has been firmly attached to the interior of the vessel, the vessel will have lost its intima, and the vein at this point will be infected; the vessel should be regarded as an infected tube and slit freely open throughout the entire area of involvement, *i. e.*, treated as an abscess cavity regardless of whether the thrombus is partial or complete, large or small, loosely attached or firmly adherent.

5. When only a sufficient opening in the vessel is made to allow the introduction and manipulation of a curette, and the vessel is not slit widely open throughout the entire length of involvement so that we can see the condition of its interior, any fistulous tract leading into the subdural space or into the brain must necessarily be overlooked unless by chance its point of communication with the sinus falls opposite the small opening that we have made in the external vessel wall.

6. If, after making only a small opening in the vessel and curetting its interior, we release the pressure, we will say from the torcular end, and get a return flow from above, we should remember that this flow may come from either a full-sized emissary vein, or from the superior petrosal sinus, or from both, and that the main sinus may be either partly or completely blocked above the openings of these vessels. Under these conditions the return flow may not be as free as a normal flow, but in the actual operation as we witness it we find that operators vary greatly in their opinion as to what constitutes either a sufficient flow or a normal flow. It might on first thought be supposed that the emissary vein would cause but little bleeding into the main sinus, but this emissary varies considerably in size, and not infrequently bleeds freely into the sigmoid.

We can only avoid these errors by discarding the above technique, dispensing with the curette, treating the condition as we would an abscess cavity, *i. e.*, slitting the external sinus wall and *exsecting it throughout the entire extent of*

thrombotic involvement (not merely to that point where we get a free return flow), and abandoning the idea that a return flow is a guaranty that no thrombus exists, or, having existed, that it has been completely extruded, and that the limits of thrombosis have been passed. We should rely not solely upon the return flow, but also upon an *examination of the interior of the vein* to determine the limits of thrombosis.

It has been advocated that our method of procedure in these cases should depend upon whether the thrombus is a partial or a complete thrombus, and to some extent upon its location. But to have these various points determined for us prior to opening the vein, while it serves to help in our description of the procedures, is largely theoretical. In the majority of cases we must approach these sinuses in ignorance of the conditions within them, and our method of procedure cannot be based upon a preconceived knowledge of the facts. While in many instances after the exposure of a sinus it is perfectly apparent that a thrombus completely obstructs the vessel, and in others it is equally certain that if a thrombus is present it is only partially obstructive, there is a large portion of these cases in which we are not only unable to tell whether the thrombus is partial or complete, but we are actually in doubt before opening the vein as to whether a thrombus does or does not exist ; more than that, those doubtful cases are numerically not in the minority. If we have followed the usual technique and are honest with ourselves, and have made an opening in the sinus through which to allow the introduction and manipulation of a curette, we will in many instances be equally as ignorant of these various points after opening the vessel as we were before.

Could we determine that the thrombus did not invade the bulb or was confined to the vertical sinus limb, no matter whether the clot were partial or complete, a compression plug should be placed first below on the bulb side of the involved area, a second compression plug above, *i. e.*, on the torcular side of the involved area (unnecessary in complete obstruction), the external sinus wall grasped with forceps, lifted, and incised. If bleeding occurs it either comes from

incomplete obliteration of the main sinus by the compression plugs, or from an emissary vein provided the upper plug were below the point of entrance of the superior petrosal into the sigmoid ; these factors of error can be easily eliminated. With a pair of scissors the external wall of the upper portion of the sinus is now slit up toward the knee, the interior of the vessel examined, and, having passed the upper limit of thrombotic involvement and reached the healthy vessel wall, the compression plug on the torcular side may be released, when a free return flow will occur.

The lower portion of the sinus is treated in a similar manner, after which the entire parietal wall of that portion of the sinus which is diseased is cut away ; a curette should not be introduced. The compression plugs should be tucked between the sinus and its superimposed bony groove. The vessel is obliterated by the intracranial pressure forcing the sinus against the firm support offered by the plug and the overlying skull.

(a) When, however, we have to deal with sinuses in which we are uncertain of these conditions, our procedures must vary ; these constitute the majority of cases. From a practical standpoint the important factor to be determined is, not whether the thrombus is a partial or a complete clot, but whether the clot is localized above the bulb or extends into it, *i. e.*, we wish to determine whether or not we can with safety produce pressure over the sinus by the gauze plug. If the sinus be involved in either complete or partial thrombosis, firm pressure over the vessel is by all means to be avoided ; by compressing the parietal against the visceral wall, we may so mash the contained clot as to force a portion of it or discharge loosely clinging particles into the general circulation.

In handling this class of cases we should gently palpate the vessel and determine if possible by this means if there is any point along its course which seems the most likely to be involved ; otherwise we select that point in the suspicious area most convenient to us. A small cylinder of gauze is now placed across the bulb end of the sinus, but the vessel is *not* compressed, and a second cylinder of gauze similarly

placed on the torcular side of the point which has been selected for opening the sinus and at a convenient distance from it. An opening is now made in the external vessel wall. Should free bleeding occur, the operator compresses the plug on the torcular side and blocks the return flow from above. If the bleeding is still free, the assistant quickly blocks the return flow from below by compressing the lower plug. If bleeding continues, we should remember that the emissary vein may be responsible, and consequently this vessel should previously have been exposed.

By getting a return flow from below, *before we exert pressure over the bulb end of the sinus* we minimize our chances of producing unnecessary pressure upon a vessel which is thrombosed, and therefore of discharging emboli into the general circulation. By opening the sinus *before producing pressure upon the torcular side* of the point of incision, we create an avenue of exit for any portion of a clot which, by our manipulation, may be set loose.

With the compression plugs in place the opening in the vein may be enlarged with the scissors and its interior carefully inspected. Should we find the sinus negative, we may proceed to investigate the region of the bulb and the superior petrosal sinus.

(b) If we have reason to fear a small parietal thrombus in the region of the bulb, not sufficiently obstructive to noticeably diminish the return flow from below, we may proceed in the following manner. A bent curette is introduced into the sinus at the site of the lower compression plug. An assistant now makes firm pressure over both internal jugulars (low down in the neck). The lower gauze plug is now removed, and such curetting as can be done is rapidly accomplished, in the hope that the thrombus, if such exists, has been dislodged. The curette is quickly withdrawn and the hemorrhage controlled by the lower compression plug, after which pressure in the neck is released. By producing pressure over both internal jugulars we eliminate to a great extent the aspiratory influence of inspiration, lessening thereby the chances of emboli passing into the general system. At the same time the backward flow through the

sinus wound is materially increased, giving the septic particles, if such are present, a better opportunity to be extruded. If we could determine that a clot were within the bulb, no attempt should be made to dislodge it prior to a jugular resection, but the above procedure refers to those cases in which the presence of a clot within the bulb is problematical and in which the evidence is not sufficient for a jugular resection; we see such cases.

(c) When the symptoms of sinus thrombosis are present, this does not necessarily mean that the sigmoid sinus is the vessel involved, although from the extension of otitic disease it is the sinus which most commonly suffers. The sigmoid may be perfectly normal in all respects, and if, after opening this vessel, we find it negative, we should remember the possibility of superior petrosal sinus involvement, and the close anatomical connection between this sinus and the field of original infection. We should remove the overlying sigmoid-sinus groove up to and slightly beyond the knee, block the flow from the torcular end, and test the patency of the superior petrosal. We should eliminate every possible source of error, for we are face to face with one of the most formidable complications of otitic disease, a successful issue from which depends upon early recognition and prompt surgical interference. When testing the superior petrosal, the emissary vein should be obliterated, as it may enter as a factor of error in judging the return flow.

(d) If after opening the vein we get but little bleeding, we have opened a vessel which is involved in partial thrombosis. If the bleeding is not sufficient to be annoying, no compression need be made, or the upper end of the sinus may be obliterated if desired. With the scissors, the lower end of the sinus is slit freely open, and as the incision is carried down into the healthy vessel wall toward the bulb and the lower limit of thrombosis passed, a free gush of blood will occur, after which compression is made. The upper end of the sinus may later be slit open with scissors, the incision passing outward until the upper limit of the thrombotic process has been reached, when compression may be

made to control the hemorrhage from the torcular end. The diseased parietal wall of the vein is removed with scissors, and the interior of the vessel is inspected.

If, after getting a free return flow from either side and placing the compression plug, we find, upon examination, the vein involved at that point, we should continue to remove the overlying sinus groove, should place a second compression plug on the distal side of the first, remove the first plug, slit the wall of the vein up to the distal plug, and so on, until the upper and lower limits of invasion have been passed.

(e) If after opening the sinus we get no return flow the vessel is occluded by an obstructive clot or is collapsed. We select the upper end of the vein and with scissors slit its external wall up toward the knee and if necessary out on the lateral sinus, until the incision has passed the upper limit of thrombotic involvement, when a free return flow from the torcular end will occur. Compression is now made.

We should not introduce a curette and attempt to dislodge the thrombus from the distal end, for we are dealing not only with an infective thrombus but with an infected vessel also, and this septic tube must be freely opened beyond the limit of its invasion, otherwise we leave behind the essential factors for a reinfection. The infected wall collapses and is held in contact with the visceral wall by the compression plug; this blocks drainage from the infected tube, a focus from which meningitis may proceed. The frequency with which a meningitis is grafted upon a sinus thrombosis should make us consider the manner in which the extension occurs. I do not hold the belief that a copious return flow is a guaranty of safety under these conditions, for this attitude ignores the infected vessel as a factor; in relation to the thrombus it is its cause. The failure to slit this infected tube wide open and to exsect it, but merely to curette its interior sufficiently to establish a return flow, is not only an unsurgical practice but, owing to the proximity of the endocranial lymph sac, an extremely dangerous one.

The lower portion of the sinus is treated in a similar manner, and if the lower limit of thrombosis is passed by the incision and the clot does not extend into the bulb, the free return flow from the bulb end of the sinus is permanently controlled. The diseased parietal wall of the vein included between the two compression plugs is now removed.

In opening the sinus great care should be taken to avoid cutting through the visceral wall. This is not an altogether uncommon accident and is a particularly unfortunate one in the young. We not only open the subdural space and invite infection, but in children whose intracranial pressure is subject to sudden increase, as during the act of crying, the danger of cerebral hernia is not remote. I have twice seen this complication arise from just this accident, both cases terminating fatally.

Indications for Jugular Resection.—If after the vessel has been slit freely open as far down toward the bulb as the bone removal permits, and we get no spontaneous return flow or an insufficient flow from below, and are unable to pass the lower limit of thrombosis, we should immediately proceed with a jugular resection and should make no attempt to curette the thrombus from the bulb before the removal of the vein. The attempt to curette a thrombus from the jugular bulb prior to jugular resection is so generally advocated, and the dangers attending this procedure are so numerous that they should be urged against it. For this reason the writer will go to some length to condemn a practice, which he feels has been responsible for many deaths.

¹(1) A dissection of the region of the jugular bulb at once convinces us that the mechanical obstacles to be overcome in an effort to curette this region are always great, more often insuperable, and that we do not generally curette beyond the horizontal limb of the sigmoid sinus.

First, if a straight instrument be used it is necessary that the curetting be accomplished around a double curve, the first curve resulting from the passing of the vertical into the

¹ The following portion of this paper was read before the Otological Section of the New York Academy of Medicine, April 13, 1905, under the title "The Danger of Attempting to Curette a Thrombus from the Jugular Bulb Prior to Jugular Resection." The date is mentioned as a matter of record.

horizontal sinus limb, the second from the sharp turn by which the horizontal limb of the sinus ascends and crooks over into the jugular bulb. Even if we remove the bony groove overlying the entire vertical sinus limb the soft tissues prevent a straight curette being depressed so as to be introduced along the axis of the horizontal limb and consequently offer an equivalent mechanical difficulty.

Second, if the instrument be curved so as to be introduced into the bulb any attempt to rotate the curette causes its end to impinge against the sides of the jugular bulb and meets with failure, for the end of the curved instrument describes in its rotation the arc of a circle having a greater diameter than the longest axis of the bulb.

Third, the partition separating the anterior from the posterior jugular compartment forbids our curetting but a portion of the bulb.

Fourth, the dome of the jugular bulb rises as a rule to such height that it luckily is placed beyond manipulative interference, and its contour prevents its being curetted.

Fifth, when hemorrhage occurs it usually is so copious that we must desist from curetting in order to control it, and we are not given sufficient time to carry out the manipulation with a degree of thoroughness which entitles us to dignify our effort by such a term. The bleeding flushes out only such portions of the clot as are loosely adherent.

On numerous occasions in the post-mortem room, with the jugular bulb exposed to direct view, I have made the attempt to curette this region and with the advantage of a larger mastoid exposure than is generally seen in the living subject; I am firmly convinced that the statement so often made that we curette the jugular bulb more frequently represents a license of expression than it does a fact.

(2) Granted that we can introduce a curette into the jugular bulb we turn to the post-mortem evidence and find that the mural implantations of septic matter are frequently so tenaciously fixed to the interior of the vessel that it is extremely difficult to remove these septic masses, even with the vessel opened and exposed to direct view, much less through a blind and tortuous channel.

These thrombi are often friable and the particles composing them show less tendency to cohere than to stick to the interior of the vein. To this latter structure they are intimately adherent, and we often are unable to observe a line of demarcation between thrombus and vessel wall. While the major portion of a thrombus may be broken down and either extruded or aspirated, the interior of the vessel may still be plastered with septic matter which the force of a return flow from the veins tributary to the bulb is not sufficient to detach. Under the influence of bacteria these septic particles clinging to the vessel wall later become broken down into an infective fluid which mingles with the blood stream, and it is this residue which causes the continuance of symptoms after a return flow from the bulb has been secured.

(3) Even though we could completely remove the thrombus from the bulb, we turn to the pathological evidence and find unfortunately that infective sinus thrombosis represents something more than is suggested by that term and in addition we are dealing with an infective pachymeningitis. The thrombus, so to speak, is the effect of which the cause is the infected dura of the vessel wall, and from a surgical standpoint the infected vessel is no less formidable than the clot. Though the clot may be removed, the infected vessel—the cause—remains, and being partly incollapsible the bulb being totally so, the space previously occupied by the thrombus now becomes partly filled with transuded serum and blood clot, and this in turn becomes infected through contact with the septic tube containing it. Later, under the influence of bacteria this coagulum undergoes disintegration and is distributed through the open avenue of the jugular.

In following the post-operative course of these cases I have been struck by the frequency with which the following phenomena may be observed. After passing a curette down toward the bulb and establishing a return flow from below which we regard as copious and sufficient, the symptoms which called for operative interference now abate; a fact showing that the process at the time is largely local, that

the factor giving rise to these symptoms has largely (or at least temporarily) been eliminated. A few days later, however, just about such time as we would expect the transuded serum and blood clot, or the remaining particles which still cling to the interior of the vein, to have undergone disintegration, there is an increasing tendency to an exacerbation of the fever; temperature fluctuations assert themselves, chills supervene, and we now perform a jugular resection but it is of no avail; the opportunity has been lost, and during this fatal interim of delay the case has slipped into the relentless grip of general sepsis.

(4) After opening a sinus we occasionally find its contained clot to be a recent one and but loosely attached to the interior of the vein. When such a thrombus extends into the jugular bulb we may grasp the clot with forceps and extract it, but the danger of this procedure is well illustrated in a case which I reported February 9, 1905, at the New York Academy of Medicine. We not only are uncertain that the entire thrombus has been extracted, but if the clot is broken off below the mouth of the posterior condylar vein, or well down into the bulb, we may get a return flow from the inferior petrosal and the tributary vessels to the region, which leads us to the false conclusion that the entire thrombus has been eliminated, whereas a portion of the clot may still remain in the upper end of the jugular vein; not only this, but the vein may also be infected. We cannot regard a copious return flow from the region of the bulb as a guaranty of safety under these conditions, nor accept it as evidence that the entire clot has been extracted, nor that the jugular vein is free, for this return flow represents the diverted currents of the tributaries to the bulb, and not regurgitated blood from the jugular vein itself.

An interesting question comes up in this connection. In those cases in which the bulb end of the sinus is thrombosed and in which with a curette the thrombus is broken down and a return flow from below established (prior to jugular resection), what portion of this return blood flow comes from the jugular vein? I am inclined to believe that the quantity of blood which comes from the vein itself is rela-

tively small in amount, and that the common idea that the main return flow is from this source is erroneous. For, as we expose the jugular in the neck, we are at once struck by the manner in which this great vessel (influenced by respiration) gulps down the blood that is fed into it. As inspiration occurs the tenuity of the vessel wall allows of an almost complete collapse of the vein, the effect being the equivalent of a valve action, while during expiration the damming up from above tends to block any regurgitation. Even though the latter influence be in great part eliminated, there is still little tendency to regurgitate, as is shown when the main vessel is ligated. While that portion of the vein above the ligature becomes bellied out and worm-like from overdistention, the portion of the vein below the ligature remains almost collapsed, even during expiration, and shows little tendency to fill. Again, if we open an uninvolved sigmoid sinus and, testing the return flow from its bulb end, find it normal, then produce pressure in the neck (low down) over the corresponding internal jugular vein, the return flow from the bulb, which at first we considered normal, now becomes greatly increased in quantity. The increment by which the original return flow is increased represents a quantity of blood which suffered an actual reversal along the avenue of the jugular. As there is such a marked difference in the volumes of the return flows under these two conditions, it becomes questionable if with the jugular uncompressed any considerable quantity of blood is regurgitated from that vein.

Again, if we produce pressure high up in the neck over the course of the internal jugular vein, a procedure which has been advocated to check hemorrhage from the bulb end of an opened sigmoid sinus, evidently upon the assumption that this return flow represents blood regurgitated from the jugular, we not only will fail to check this hemorrhage, but we will actually increase it, a procedure which shows conclusively that the return flow from the bulb end of the sinus is not from the jugular vein itself, but represents the currents from the tributaries to the bulb which, having their usual avenue of egress blocked, are now diverted. When we,

therefore, get a return flow from the bulb end of the sigmoid sinus after the removal of a clot, we should be wary of interpreting this phenomenon as being of definite import, or of concluding that this return flow comes from the jugular vein itself, and can therefore be regarded as evidence of the patency of that vessel or of its non-involvement.

This point has a vital bearing upon the technique of the operation; it illustrates the danger of assuming that we are safe when, having removed a thrombus from the vicinity of the bulb prior to ligation, we get a free return flow from below; it argues jugular resection prior to an attempt to break down a thrombus in the lower inaccessible portion of the sigmoid or in the vicinity of the bulb.

(5) In breaking down a thrombus in the region of the bulb, the broken-down particles will be of various sizes, some of which will in all probability be too large to flush between the instrument and the vessel wall. For all these emboli to be flushed out through the sinus wound, they must be carried in the contrary direction to the natural current, must be flushed backward against gravity and against the varying curves of the sigmoid sinus, which act sometimes in the manner of a valve. At the same time the curette introduced within the lumen of the sinus considerably blocks the egress of the particles; the instrument will remain within the vessel for several seconds, while the manipulation is being carried out, during which time several inspirations will inevitably occur. Each of these almost completely empties the jugular vein. As this vessel refills, it draws its chief supply from the pool of blood within the jugular bulb; if now by instrumentation we have suspended infective particles in this reservoir, we have sown the seed for general sepsis, we have brought a local process to the verge of a general condition, over which human effort has little influence or control. An inspiration may be all that is needed to generalize the sepsis. At this moment we shift the responsibility to chance. If the clot within the bulb is non-infective, and occasionally it is (but experience has taught us that we do not know this at the time of operation and have no right to assume it), and it merely repre-

sents a protective barrier to the further invasion of the septic process, we expect no evil results other than those arising from the plugging of vessels by non-infective emboli; dependent upon the sites at which the arrests are made may we or may we not have trouble.

In this connection I mention a phenomenon which I have frequently observed after an attempt has been made to dislodge and break down a thrombus in the vicinity of the bulb, prior to jugular resection. We find that the patient complains, subsequent to the operation, of shifting pains, pains in or about the joints, in the chest, or elsewhere, which soon subside, only to appear in some distant locality. We apprehend metastases, but no abscess formation follows, and the pains soon disappear. The relation between our operative procedure and this phenomenon of pain, which skips from point to point, seems so close that we are at least entitled to suspicion that responsibility for this pain is in the dissemination of emboli, the infectivity of which is not sufficient to cause local abscess formation, but which no less argues against the practice of breaking down a clot in the vicinity of the bulb before closing the great avenue of entrance to the general circulation.

When, however, our surgical attitude is based upon a chance guess that the thrombus within the bulb is non-infective, we sacrifice an unnecessarily large percentage of the cases. It is scarcely conservatism to suppose that a thrombus, arising from an infective process, is sterile; a portion of it may as yet be uninvaded, it may not be broken down, but its naked-eye appearance is no index of its infectivity, and it is in violation of pathological facts for us to assume that we can point out the line of demarcation between infected and non-infected clot. I am aware that some operators, after making an attempt to curette the jugular bulb, and failing to get a return flow and consequently to dislodge the thrombus, leave it in the hope that the clot is not infected and do not proceed with a jugular resection, but return the patient to bed to await developments, and trust to the benevolence of chance. Considering the high mortality and the frequent metastases which follow this

procedure, the practice deserves mention only that it may be unqualifiedly condemned.

If for any reason, as through the intervention of shock, we are forced at the time to abandon the jugular operation, we may, before attempting to remove the thrombus from the bulb end of the sinus, resort to a procedure advocated by the writer, and which he believes to be of advantage in such cases. We institute pressure in the neck, low down, not only over the course of the internal jugular of the same side, but over both internal jugulars, the opposite jugular being compressed slightly prior to its fellow, by which procedure we eliminate to a great extent the aspiratory influence of inspiration (the most important factor in the dissemination of septic particles), and at the same time materially aid in flushing the suspended particles backward through the sinus wound (*American Journal of the Medical Sciences*, February, 1905).

(6) The aspiratory influence of inspiration is a most important factor in disseminating septic particles suspended in the pool of the jugular bulb, and this factor should never be disregarded. This in itself is sufficient to condemn any attempt to break down a thrombus in the region of the bulb before the great avenue of entrance to the general circulation has been closed to these infective emboli. Before an attempt is made to dislodge a thrombus from the bulb, the aspiratory influence should, as far as possible, be eliminated, and this is partly accomplished by a jugular resection—it is one of the great reasons for a jugular resection. Unfortunately too much credence has been placed in the claim that the intracranial venous sinuses enjoy an immunity to aspiration; they, without doubt, are protected from excessive aspiration, but by no means are they exempt. That this influence is not sufficient under normal conditions to convert the current in the sinus into an intermittent one and to register itself as a dimpling of the sinus wall during the inspiratory act we do not doubt, but this does not mean that the sinus contents are not aspirated. When the intravenous currents are disturbed, as in sigmoid-sinus thrombosis, we not infrequently witness the effect of inspiration

upon the sinus, demonstrating itself by the dimpling of its parietal wall during the inspiratory effort. That the aspiratory influence in the latter instance is increased there is no reason to believe; merely under the conditions of disturbed circulation does inspiration so succeed in registering itself that we may witness its effect upon the vessel as a naked-eye phenomenon. Under these conditions the danger of air embolism is greater only from the fact, however, that the lumen of the vessel is imperfectly filled by blood and a vacuum exists; not from the fact that the aspiratory influence is changed. Suspended septic particles set loose by the curette in the region of the jugular bulb will be subjected to the aspiratory influence, whether the external sinus wall has or has not dimpled during the effort of inspiration.

(7) There is another factor which plays an important part in the dissemination of suspended particles set loose in the region of the jugular bulb, and for the consideration of which it is necessary to somewhat diverge.

It has long since been pointed out that the blood stream in the inferior petrosal sinus is in all probability a particularly swift current, having a more rapid rate of flow than the current of the sigmoid sinus. In favor of this view has been mentioned the fact that the inferior petrosal is a straight sinus, and has a considerable fall from its source, the cavernous sinus, to its point of entrance into the jugular bulb; that between these two reservoirs the inferior petrosal enjoys a considerable declivity. The pulsation of the carotid artery transmitted to the cavernous sinus has also been mentioned as a factor tending to increase the rate of flow within the inferior petrosal, acting, as Macewen has ingeniously suggested, "like a hand pressing gently upon an india-rubber ball."

That the pulsation of the carotid increases the rate of the current in the inferior petrosal sinus, while representing an ingenious theory, I see no particular reason to believe. For, as an artery pulsates it straightens out in a direction from the heart—*i. e.*, in the direction of its own current, which is here in a contrary direction to the current in the inferior

petrosal sinus. The pulsation of the artery would consequently act as a retarding influence upon the flow within the sinus, as the tendency would be as the artery lengthens to milk the current of the cavernous and consequently that of the inferior petrosal forward—*i. e.*, in the contrary direction to its usual flow.

Regardless of the influence of the carotids upon the inferior petrosals, there still remains strong evidence in favor of the supposition that the currents within these vessels are particularly rapid.

In studying the relations of the inferior petrosal sinus, the factor which appeals to me as the most apparent and forceful argument in favor of a rapid flow within this vessel is, that the inferior petrosal is anatomically so placed that it is in a most advantageous position to be aspirated.

1. In direction it represents the continuation of the internal jugular vein, and the mouth of the sinus is aimed directly at the opening of the jugular, so that the inferior petrosal pours its blood stream directly at the orifice of that vessel.

2. Whatever the aspiratory influence may be, it proportionately is exerted to a greater extent upon the inferior petrosal sinus than upon the sigmoid; for the sigmoid is somewhat protected from aspiration by its varying curves, by its right-angled position to the jugular vein, and by reason of the fact that the jugular bulb is on a higher horizontal level than the horizontal limb of the sigmoid sinus, in consequence of which we have a goose-neck mechanism.

The arrangement of the inferior petrosal sinus, however, instead of suggesting a provision against aspiration, suggests the contrary. A short, wide, straight, and incompressible vessel on a higher level than the jugular bulb, with a sharp declivity, placed in direct line of aspiration and connected with the large venous reservoir, the cavernous sinus, would seem to suggest that the inferior petrosal enjoys the distinction of being a governor, through which the flow of blood in the intracranial venous sinuses is capable of being regulated through the mechanism of aspiration.

The arrangement of the inferior petrosal sinuses and their

relation to the jugular bulbs not only suggest the part played by these vessels in the hydraulics of the intracranial-sinus system, but the importance of the aspiratory influence of inspiration as the means whereby this is accomplished.

The swift current issuing from the mouth of the inferior petrosal as it traverses the pool of blood within the jugular bulb must create a suction which tends to drag in after it suspended particles set loose by instrumentation and to carry these emboli down through the avenue of the jugular into the general circulation for distribution.

(8) When the sigmoid sinus is thrombosed and blocked and fails to feed the jugular bulb with the quota of blood which under normal conditions it pours into that reservoir, the probabilities are that under these conditions the current in the inferior petrosal sinus is even more rapid than under ordinary conditions. For the aspiratory influence is a fairly constant factor, and is now expended not upon the sigmoid sinus, but upon the jugular bulb and its few remaining patulous tributaries, the inferior petrosal being a chief one. The reservoir of the bulb being insufficiently supplied by blood (insomuch as its main source of input, the sigmoid, is now blocked) becomes emptied or nearly so with each inspiratory effort, the result being that a vacuum is created in the bulb, in consequence of which the rush of blood along the inferior petrosal sinus and the other tributary vessels to the bulb is encouraged in order to overcome the vacuum. That such a vacuum does exist under these conditions we can easily convince ourselves when having exposed a normal sinus we institute the mechanical equivalent of a thrombus, *i. e.*, pressure with the finger upon the lower portion of the vertical sinus limb. As the obstructive pressure increases to that extent where the input from the torcular end of the vessel falls short of the quantity of blood which with each inspiration is withdrawn, the lower portion of the sinus immediately begins to aspirate. When, therefore, we attempt to curette a thrombus from the region of the bulb in the operation for infective sigmoid-sinus thrombosis, we are confronted by the hydraulic conditions which particularly predispose at this time to the passage of suspended particles

into the general circulation along the unobstructed avenue of the great vein in the neck.

Aspiration under the above conditions is notably to be well observed in children, for which reason in this class of cases it is particularly dangerous to attempt to break down a thrombus in the region of the bulb prior to jugular resection.

For the above reasons the attempt, which is so generally advocated, to break up a thrombus in the region of the bulb prior to jugular resection, in order to establish a return flow from below, I believe to be the most dangerous procedure ever advocated in the technique of the operation for infective sigmoid sinus thrombosis, and in a considerable number of cases I have watched this point with care. Of those cases which I have personally observed, in which after the external wall of the sinus has been freely opened, in which no spontaneous return flow comes from the bulb, and in which a curette is now introduced down toward this region, the clot broken up and a return flow secured, the major portion have died of the effects of sepsis. Of those that have recovered, the great majority have either developed metastases (which luckily failed to occur in some vital organ) or have later had the jugular removed.

The Question of Preliminary Jugular Ligation when Aspiration of the Sinus is Observed.—On exposing the sinus we occasionally notice a dimpling of its parietal wall during the inspiratory act. When aspiration of the sinus is observed, the important practical question immediately arises as to whether a jugular ligation should or should not be resorted to before opening the sinus, in order to eliminate as far as possible the danger of air embolism. Many operators answer this in the affirmative.

If we adopt this plan we will in many instances ligate jugulars which are in no way involved, and for no other purpose than to overcome a mechanical difficulty which it may be possible to solve by simpler means.

When the external wall of the sinus dimples it does not necessarily indicate the position of the clot; the obstruction may be on either the torcular or the bulb side of the point

which dimples, more probably on the torcular side. Moreover it does not indicate whether the thrombus is partial or complete; it may be either; it is necessary, however, that the clot be highly obstructive. When aspiration of the sinus is observed we should at once expose a considerable length of the vessel wall. A point is now selected on the torcular side of the point which dimples and by pressure with the finger the lumen of the sinus is obliterated. At the same time we notice whether or not this influences the aspiration of the vessel. If under these conditions the sinus dimples as before, the thrombus is on the torcular side of the dimpling-point. In carrying out this procedure attention should be paid to three factors.

1. The point at which pressure is made should be at sufficient distance from the point which dimples to prevent traction being transmitted along the external vessel wall to that point, and consequently affecting the phenomenon by stretching the vessel wall.

2. The emissary vein should be temporarily obliterated.

3. The point at which pressure is made upon the main sinus should be, if possible, below the point of entrance of the superior petrosal into the sigmoid.

The attempt should now be made to see if the vacuum can be overcome. To determine this we exert pressure in the neck (low down) over both internal jugulars, and lower the head. If, under these conditions the sinus fills and the dimpling disappears, we can proceed as under ordinary conditions of thrombosis, for the intravenous relations are temporarily restored. With pressure still continued we can with safety open the sinus, slit the external wall with scissors down towards the bulb as far as the vessel involvement may indicate, judge the copiousness of the return flow, and if this seems normal, and the lower limit of vessel involvement has been passed, a compression plug may be placed over the bulb end, and a jugular resection avoided. The external wall of the torcular end of the sinus may now be slit open, the incision being carried out into perfectly healthy vessel wall, beyond the limit of thrombosis, when compression is made.

To perform a jugular resection immediately upon observing aspiration of the sinus is a hasty procedure, *for aspiration may not only occur through the direct avenue of the jugular of the same side, but also through the indirect avenue of the opposite jugular*; I have twice seen this occur. It is extremely important, from a surgical standpoint, not to regard the intracranial venous sinuses as distinct vessels, but as portions of a common circuit. The greatest length attributable to any individual sinus, surgically speaking, should be that portion of the vessel included between the two nearest consecutive branches of sufficient size to transmit the influence of aspiration.

Exerting pressure low down in the neck over the course of the internal jugulars in such a procedure as the above is not an altogether unmixed good. There are some dangers which may arise from such a practice, but a careful consideration of these will show that these dangers are in no way to be avoided by a jugular resection; in fact are more imminent when a jugular resection is immediately resorted to, and a brief consideration of the hydraulics of the venous system will convince us of this fact.

When we exert pressure in the neck over an internal jugular vein, we cause a sudden blocking of the current, a damming back of the blood columns, a swelling of the tributary veins, a tendency to a reversal of their currents along the avenues of communication, at the same time to dislodge any loosened particles of a contained thrombus and to force these emboli into the general circulation along the paths of least resistance. We do the same thing when we immediately resort to a jugular ligation, with the difference that it is done very much more effectively.

When, however, both internal jugulars are simultaneously compressed, the few remaining avenues of entry into the general circulation become in their capacity for returning the great volume of cervical and cranial venous blood relatively small and incompetent for the task which has suddenly been imposed upon them, in consequence of which the blood columns in general do not so tend to reverse themselves along the avenues of communication with the

opposite side as they do to temporarily stagnate ; as proof of which we note the tremendous congestion of the superficial veins under these conditions. If now with the blood columns in a condition of temporary retardation (during which time we can quickly determine whether or not the vacuum in the above experiment can be overcome) the sigmoid sinus be widely opened it immediately becomes the path of least resistance, and, moreover, this avenue of exit is in direct proximity to the involved area, under which circumstances the dislodged particles would have a better opportunity to be extruded.

When, on the other hand, we immediately resort to a jugular ligation upon observing aspiration of the sinus, any particles which should chance to be detached by the reversal of the blood currents would pass readily over into the circulation of the opposite side. As proof of this is the fact that when one jugular alone is compressed or ligated there is no noticeable congestion of the veins of the head, and this is what would naturally be expected, for the various communications existing between the branches of the two great jugular trees afford such ample opportunity for compensation to occur that these communicating branches show no visible taxation. If now the sigmoid sinus is unopened, the suspended particles having no avenue of exit are forced along the paths of least resistance into the general system through the unobstructed avenues of communication.

When only one jugular is blocked, either temporarily by the finger or permanently as by ligature, the tendency to a reversal of the blood currents along the avenues of communication with the opposite side is greater, and a tendency to a stagnation of these currents is less than when both jugulars are compressed. This is a point of considerable practical importance. No matter whether we resort immediately to a jugular resection upon observing aspiration of the sinus or attempt the above experiment, the patient is subjected to a certain risk ; that is, such danger as arises from the reversed blood current dislodging loosened particles of a thrombus, and carrying these emboli into the general system. This risk, however, is the inevitable tribute which

the conditions impose upon the patient, and is not to be completely avoided by any measure that we may institute. Of what value the above procedure may be I do not know; in only one instance have I had an opportunity to try it, but in this case it rendered unnecessary the jugular operation.

Indications for Primary Jugular Resection.—The indications for a primary jugular resection are rare. (1) If in addition to symptoms pointing to sinus thrombosis we find along the course of the internal jugular induration, tenderness, and the cord-like swelling so frequently referred to in literature, primary removal of the vein is indicated. I have seen but one such case. We must differentiate this condition from Bezold's perforation complicating mastoid disease with symptoms of septic absorption.

(2) When in addition to symptoms pointing to sinus thrombosis we have the phenomenon of metastasis I would primarily resect the jugular vein. While we frequently see metastases follow operation (due in no small measure to the attempt to break down a thrombus in the region of the bulb prior to jugular resection), it is uncommon to see metastases antedate the operation. Of the forty-four cases observed by the writer, none has shown metastases prior to operation. The second indication is therefore comparatively rare.

Jugular Resection after Exposure of the Sinus but Prior to Opening it.—If after the exposure of a sinus it is evident that a thrombus extends down into an inaccessible portion of the sigmoid, or that the clot in the lower portion of the vessel is in a condition of disintegration, we should resect the jugular before manipulation or opening the sinus. We see few cases in which prior to opening the sinus we can determine the lower limit of thrombosis—in fact, are unable in the majority of cases at this time to definitely inform ourselves of the presence of a clot. If we rely upon our ability to diagnose the presence of a thrombus in the sinus or to determine its lower limit of invasion, and then proceed to resect the jugular before opening the sigmoid (a practice recently advocated), we will resect many normal jugulars; we will later

open many sinuses which will bleed copiously from their bulb ends and which are free from clot, or in which the clot does not extend into an inaccessible portion of the sigmoid or into the bulb, and in which a jugular resection is therefore unnecessary, and we not infrequently will remove jugulars from cases of meningitis, cases which we have erroneously diagnosed as sinus thrombosis, being misled by both the symptoms and the appearance of the vessel. Such a practice is an unnecessarily radical and dangerous procedure. Of the fifteen cases operated upon by the writer, in seven the thrombus was confined above the bulb and so located that the vessel could be opened well beyond the lower limit of invasion. These cases recovered without having their jugulars removed and without developing metastases. In searching the reports of the New York Eye and Ear Infirmary, it will be found that of sixty-one cases of sinus thrombosis the thrombus was located above the bulb in forty-six per cent.

Jugular Resection.—The operation of jugular resection is under certain conditions a most rational and beneficent procedure; it is a logical imitation of the process of thrombosis, the example set by nature in her effort to interpose a protective barrier between the invader and the invaded; it is the picture of defensive warfare.

This operation has never met with its just dues and from some sources has been severely condemned. The explanation is not far to seek and is to be found in the fact that the average jugular resection performed to-day is performed too late—after a sinus operation has proven to be inefficient—often at a time when the process has passed from a local into a general condition, a time when we may expect no surgical procedure to stay the progress of this fatal malady.

Before resorting to a jugular resection we naturally ask ourselves, What do we accomplish by this operation? As we generally consider it, the primary object of the jugular resection is to cut off the avenue by which septic emboli enter the general circulation, and to some extent this is accomplished. At the same time the influence of aspiration upon the broken-down particles which we dislodge is in

great part eliminated. The extensive character of the disease, however, as we see it in the post-mortem room, involving as it does not only the sinus and the jugular, but their tributaries, suggests that the operation of resection must, in order to succeed, accomplish more than the mere blocking of the main avenue of entrance, otherwise the recoveries would be fewer; for the tributary vessels to the sinus and the jugular, particularly the vessels tributary to the bulb, are vessels of considerable size and afford ample opportunity for infection to take place through their avenues; moreover, these avenues are not infrequently invaded. As we resect a jugular vein, in addition to blocking the main avenue of entrance to the circulation we cause a sudden tendency to stagnation in the multitudinous branches of the jugular tree and bulb, with the result that we take the primary step toward interposing between the area of infection and the general system numerous non-infective coaguli, which hem in the involved area and tend to localize it. For this reason we resect the jugular instead of ligating it, and remove the vein low down in the neck and not high up. Otherwise a collateral circulation may be established which will thwart this protective coagulation in the tributaries, which we desire. The importance of this is also suggested by the following clinical fact: in exposing the jugular in the neck we not infrequently find this vessel partly or completely collapsed. The vein may contain no clot and its walls may not be invaded, yet the mortality in these cases is exceptionally high, regardless of the jugular resection. The imperfectly filled condition of the vein points to the involvement not only of the main vessel, but to the involvement of its tributaries, and argues extensiveness—*i. e.*, invasion of the by-paths to the main sinus, avenues surgically inaccessible.

We now ligate the jugular vein, but we accomplish little, for its collapsed condition was the equivalent of a ligature, and by tying it we do not succeed by one iota in bringing about that protective coagulation in the tributaries on the cardiac side of the septic thrombi which occupy them. The jugular resection consequently fails in one of its most

important accomplishments for the reason that the disease has preceded us and interposed septic instead of sterile coaguli in the tributaries. The process may yet be local, but we are helpless to hem it in, to prevent its spread along the tributaries to the bulb, or in fact to influence it by tying the collapsed jugular of the involved side. We without doubt meet such cases, and in which we erroneously regard the septic process as having become generalized at the time of operation, for the reason that our surgical measures later prove inadequate, and the patient passes into general sepsis, or, as we suppose, continues in general sepsis. Unfortunately when we resect a jugular vein we do not succeed in bringing about a sudden coagulation in the jugular bulb or in the tributaries thereto unless the bulb and a good portion of these tributary vessels are already blocked by thrombi. To eliminate the currents in the bulb we must do something more than the jugular resection.

When the lower inaccessible portion of the sigmoid or the region of the bulb has become the recipient of a septic thrombus, the numerous avenues of communication between this region and the general circulation, along which infective emboli may be carried, constitute a disadvantage. For as the jugular is resected and as the clot is removed from the lower portion of the sinus, the current issuing from the inferior petrosal, if this vessel be not blocked, having its usual avenue of egress now cut off, fills the bulb, and as pressure within this cavity rises there is not only a tendency to a slow stagnation within the bulb, but also a tendency to a reversal of the blood currents of the lesser tributaries, along which avenues septic emboli may be swept into the general system. When, therefore, we attempt to break down a thrombus in the vicinity of the bulb, even after the jugular is resected, we are exposed to some risk from emboli. The danger of disseminating septic particles, however, is not so imminent as when the great avenue is open.

The complete and rapid obliteration of the bulb by a non-infected coagulum is surgically to be desired, for just in proportion as we can hem in and localize the infected area do we expect success. If we accomplish this, even though the

coagulum in the bulb later becomes infected and broken down through contact with an infected bed, we will have succeeded in bringing about a sterile thrombosis in the uninvolved tributaries to the bulb and in blocking these avenues of entry to the general system. In order to accomplish this we must eliminate the factors which tend to keep up the currents in the bulb after the jugular has been resected. The most responsible factor for this is a cross current established between the inferior petrosal sinus and the posterior condylar vein, or, in case the latter vessel is absent, through that tributary next in size to the inferior petrosal. While the jugular resection constitutes the chief and primary step toward this end, we ultimately accomplish our object (a sudden coagulation) only when we have introduced gauze into the bulb, or as far as the mouth of the posterior condylar. I consider this an essential step in the operation of sinus thrombosis when a return flow has been obtained after the removal of a thrombus from this portion of the vessel. It is altogether unnecessary to introduce gauze into the bulb end of the sinus for the purpose of controlling hemorrhage. To accomplish this we should tuck a cylinder of gauze between the sinus and its overlying skull, a most excellent practice first advocated, so far as I am aware, by Whiting. When we do not succeed in establishing a return flow from the bulb, the packing serves for such drainage as may be accomplished.

In these formidable cases of sinus thrombosis we should resect the jugular vein with the idea of bringing about just as extensive a coagulation in the branches of the jugular tree and bulb as is compatible with the least venous return flow which will insure against systemic disturbance arising from faulty venous return circulation; for we have no way of determining the limit of the infected area or the branches which are involved, and after a jugular has been removed and submitted for examination it is not uncommon to find branches, which at the time of operation were patulous and apparently normal, invaded and occupied by partial thrombi. I have repeatedly seen the main vein itself, which at the time of operation appeared normal, show upon ex-

amination extensive partial thrombosis. We cannot with the eye judge the extent of the vessel involvement, nor detect the lower limit of its bacterial invasion, for which reason it behooves us to ligate the vessel low down in the neck and not, as has been advocated, in the middle of its course. Equally to be condemned is the practice of ligating the vein below and above and allowing it to remain in the neck; by doing this we fail to bring about that protective coagulation in the involved tributaries. Currents continue to flow through this network of septic vessels, and we fail to interpose those protective barriers which it should be our endeavor to place between the involved tributaries and the general circulation.

The above practices carry with them no less a conviction than that their advocate has lost sight of the pathology of the disease and fails to appreciate the significance of this surgical procedure. It is also a fact that a non-infective thrombus or sterile coagulum may undergo disintegration and absorption, and that the vessel's patency may be restored. Though we temporarily produce an extensive obliteration of the jugular tree, this does not necessarily argue permanency, and without doubt a considerable portion of these occluded avenues will be restored to a useful function.

It occasionally so happens that we are given an opportunity during the operation to observe the manner in which the blood stream, influenced by respiratory action, brings about the dissolution of a thrombus and restores the vessel's patency.

When the thrombus extends down into the jugular, and as that partly filled vessel is exposed to view, we notice what appears to be a propulsion of the contained blood column against the cardiac end of the thrombus, and this in turn succeeded (during inspiration) by its withdrawal and the emptying of the jugular vein. It appears as if an air bubble were within the vessel running up and down. This alternate licking of the thrombus by the blood column and the "milking" of the vessel by the inspiratory act, plays an important part in restoring the patency of the veins and

has an important bearing upon the following clinical fact:

In delayed jugular operation it is not uncommon to find a portion of the vessel a purulent, infiltrated cord with its walls many times their normal thickness, with the endothelium gone, and which when cut across stands out as an open tube—*i. e.*, the most favorable conditions exist for thrombus to be present, yet the vessel contains neither blood nor clot. That the vessel did once contain a clot which under the above influence (plus that of bacterial activity) has been disintegrated, is highly probable and explains the almost uniform mortality in these cases, for the condition imposes that a large portion of the thrombus has already been distributed to the general circulation, and that consequently the disease is no longer local. Certainly the great majority of these cases die of sepsis, even though we succeed in ligating the vein at a point which appears to be below the limit of invasion.

It is not a little remarkable that after the complete obliteration of the internal jugular, the sigmoid and lateral sinuses of the involved side, no ill results follow which can be attributed to the disturbed circulation caused thereby.

In the first place, thrombosis takes place gradually and the element of time is given the remaining vessels to adapt themselves to the necessity of compensation. The numerous communications existing between the branches of the two great jugular trees and the connected system of sluiceways represented by the intracranial venous sinuses and the ease with which a vein meets the task of encompassing a larger volume than that to which it is ordinarily accustomed are factors which as a rule insure against this accident. In only two instances have I ever seen phenomena arise which might be attributed to embarrassed venous return due to ligation. The first was a case in which a complete thrombus extended from the torcular Herophili to the point of entrance of the facial into the jugular vein, and in which the lower portion of the jugular was partly filled. The vessel was ligated behind the sterno-clavicular joint, and about the fourth day following operation papillitis was noticed in the

eye of the corresponding side; papillitis had, however, existed in the opposite eye prior to the ligation, and it is doubtful if the jugular resection was responsible for the second papillitis. The second case was one in which after the ligation and resection of a jugular containing a generous volume of blood, and in which the remaining vessels had suddenly the task of compensation imposed upon them, there developed a sudden and transient mania. In no instance have I been able to observe an increased congestion of the retinal veins immediately after resection, nor has there been any observable difference between the vessels of the two eyes. I have watched for this in a large number of cases. In the case just mentioned, in which papillitis appeared, a second examination of the eye was not made until the fourth day following the jugular resection, at which time it was observed. In this instance congestion of the retinal veins might have been observed immediately after the resection, but this is problematical.

The ease and rapidity with which compensation occurs brings up the question of how far can we go in an effort to bring about an extensive thrombosis in order to isolate the infected area. For when the disease has invaded the tributary veins to the main vessels it has truly become formidable. We can no longer reach these individual avenues by direct surgical interference, and our only remaining chance at localizing the process is to imitate the example set by nature and to bring about an extensive protective thrombosis in the hope of causing these barriers to effectually block the invaders, or, failing in this, to so retard the progress of the invasion as to feed the system by a more graduated septic dosage, under which circumstance the human organism is given the better opportunity to fight its battle upon the basis of individual resistance and a possible partially acquired immunity.

There is sufficient evidence to arouse the suspicion that in a portion of those cases that die of gradual exhaustion, in which the post-mortem reveals no metastases and in which during life the blood proves bacteriologically negative to both microscopic and inoculative tests, the process remains

local until a very late period in the disease; that is, a true invasion of the blood by hordes of organisms in sufficient numbers to propagate themselves and to keep up symptoms without assistance of reinforcements from the original source of infection does not exist. In other words, could the original focus of infection be eliminated or hemmed in and localized, the septic dosage which at any given time is in circulation, no matter whether the septic dosage be small numbers of organisms or their toxins, could be successfully gotten rid of by the general system. Could we know the truth in these cases, could we determine with a fair degree of accuracy the time at which the process was passing from a local into a general infection, and having determined previously by experiment those vessels the obliteration of which would bring about the greatest tendency to hem in the involved area with the least disturbance to the return circulation, I would expect that we not infrequently would be entitled to a supreme effort at localization. I believe that along these lines further surgical progress is to be made in these very formidable cases. Success depends upon our ability to localize the disease and our various surgical measures are but means toward that end.

While no attempt will be made at a description of the jugular operation, there are some points concerning it which may be mentioned. In sterilizing the field of operation, inasmuch as we do not know the condition within the jugular (it may be occupied by a disintegrating thrombus), great care should be taken not to knead the neck. It is best to grasp the skin and lift it from the underlying tissues, and such scrubbing as is done should be without pressure.

In exposing the vein, it should be our endeavor to ligate it low down in the neck and as soon as possible. By ligating early we tend to block the avenue of entrance to particles which in the manipulation necessary to expose the vessel in its entire course may be set loose.

The branches as well as the main trunk of the jugular tree should be removed, for we too often find upon microscopic examination a vein invaded by bacteria or thrombus which during the operation we considered uninvolved.

In those cases in which, owing to an inflammatory condition of the vein, the vessel has become soldered to its surrounding tissues, and in consequence is difficult to remove, time should not be sacrificed in trying to exsect it. The main vessel and its branches should be ligated and slit open and the neck wound should not be sutured.

The attempt at primary union in these neck wounds is so contrary to surgical principles and so signally fails that it should not be made. We are scarcely justified in imposing upon an already septic patient, whose fight for life is desperate, the danger of an unnecessary neck infection, when the only advantage gained is a remote possibility of a better cosmetic result.

After the operation it is the custom of some to flush the jugular bulb and that portion of the vein which still remains in the neck, introducing the nozzle of a syringe into the vein and forcing the stream through into the sinus, or *vice versa*. If we place carmine granules in the jugular bulb, or in the lower portion of the sinus of a cadaver, and practise through-and-through irrigation, the wide dissemination of these granules to be seen upon dissection will convince us of the danger of this practice. If through-and-through syringing is done, it is far safer (as can be proved by actual demonstration in the above manner) to irrigate from the sinus through into the jugular—*i. e.*, in the natural direction of the current, than to irrigate from the vein through into the sinus. This is due to the manner in which the tributaries enter the bulb, and to the arrangement of the plicas about their mouths. Either practice should be condemned.

After the removal of the jugular, a bent curette should be inserted into the bulb end of the sinus and such portions of the thrombus as can be detached should be removed. During this manipulation, pressure should be made over the upper end of the internal jugular vein of the opposite side, as aspiration of the involved bulb may occur through this avenue.

The eradication of the bulb of the jugular vein, as described by Grunert, where the sinus, bulb, and jugular vein are converted into a continuous groove with a common

external opening, is a procedure with which the writer has had no experience. In the review of Grunert's monograph by Arnold Knapp¹ the operation is said to be indicated when, with the continuation of severe pyæmic symptoms, the disintegrated thrombus of the jugular bulb cannot be satisfactorily treated by manipulation from the sinus above or the vein below, or by irrigation, and in certain forms of primary bulb thrombosis.

¹ These ARCHIVES, vol. xxxiv., p. 172.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE THIRD QUARTER OF THE YEAR 1904.

BY PROF. ARTHUR HARTMANN.

Translated by Dr. ARNOLD KNAPP

ANATOMY AND PHYSIOLOGY.

242. KATZ (Berlin). The stria vascularis of the bat. *A. f. O.*, vol. lxii., p. 271.

243. KEILSON (Russland). Anatomic and topographic investigations on the mandibular condyle and on the external auditory meatus. (From the Ear Clinic of Professor Passow.) *Inaug. Dissert.*, Berlin, 1904.

244. PASSOW (Berlin). Anatomic examinations on the occurrence of fractures of the auditory canal, with demonstration of patients. *Deutsche med. Wochenschr.*, No. 31, 1904.

245. DELOBEL (Paris). Topographic iconography of the ear in the new-born. *Arch. intern. d'otol.*, etc., vol. xvii., Nos. 1-3, and vol. xviii., No. 4.

246. BIELSCHOWSKY (Berlin). Impregnation with silver of the neurofibrillae. *Jour. f. Psychol. u. Neurologie*, iii., 1904.

247. INGERSOLL. A study of the development of the nose and its accessory cavities. *Ann. of Otol., Rhin., and Laryngol.*, June, 1904.

248. BUSER (Reinach). Are the high palate, narrow and V-shaped curvature of the alveolar arch, as well as anomalies in the position of the teeth, a consequence of mouth-breathing and of labial pressure? *Arch. f. Laryngol.*, vol. xv., part 3.

249. GENTER. On the presence of cartilage in the tonsils. *Wrat-schebnaja Gazeta*, No. 27, 1904.

250. STRIN (Moscow). The physiologic importance of the centrifuge to determine disturbances of functions of the aural labyrinth. *Le physiologiste Russe*, Nos. 48-60, 1904.

251. BARTH (Leipzig). On the formation of the human voice and its timbre in singing and speaking, from physiologic and physical standpoints. Leipzig, Johann Ambrosius Barth, 1904.

242. The two microscopic sections of the stria vascularis which KATZ has demonstrated before the German Otological Society, 1904, are reproduced in the accompanying plate. The condition found present in the second section, which was stained according to van Gieson, shows that the stria vascularis is not a true epithelium carrying blood-vessels, but is composed of a number of different tissues (epithelium, vessels, and connective tissue).
HAENEL.

243. On Passow's instigation, the author examined a large number of skulls, with especial reference to the lower jaw and the relation of its articular head to the bony ear-canal. If the axes of the articular heads are horizontal, the condyle in the presence of a well-developed posterior articular process is of little account for the anterior canal-wall, and an injury to the latter does not follow a traumatism. If, however, the axes of the articular heads converge, their medial ends, especially when the posterior articular process is small, are apt to injure the anterior bony canal-wall. In this case a slight injury suffices to cause a perforation of the anterior bony canal-wall.
BRUEHL.

244. PASSOW has observed a case of direct fracture of the auditory canal (a shot wound) and three cases of indirect fracture (in one a fall from the stairs, in two a fall from a bicycle), and discusses the anatomic relations which are of moment in producing a fracture of the auditory canal. Of greatest importance in this connection is the very variable thickness of the anterior auditory canal-wall and the varying development of the posterior articular tubercle as well as the form of the condyle. If the bony spiculæ which are produced by a blow against the inferior maxilla are cast off, a depression results in the anterior wall, and movements of the jaw cause a displacement of the membranous canal. If, on the other hand, the bony spiculæ reattach themselves, a marked formation of callus results, with subsequent stenosis of the auditory canal.
NOLTENIUS.

245. DELOBEL made sections through the labyrinth and middle ear of the new-born in three different planes, and photographed certain sections from each of these series. The thirty-one illustrations are accompanied by a short text and are of service in elucidating the normal microscopic anatomy of the ear.
OPPIKOFER.

246. After fixation of the central organ in 12 % formalin, wash-

ing in water, staining twenty-four hours in 2 % nitrate of silver, two to ten minutes in an ammoniacal solution of silver, reducing in a 20 % solution of formalin, and finally treating the sections with gold-chlorid-acetic acid to remove the insufficiently reduced silver, the sections are placed for half a minute in 5 % sodium thio-sulphate. The axis-cylinders and intracellular fibrillæ appear as dark or pale brown threads on a pale brown background. The author examined the intracellular structure in normal and pathological conditions. The silver impregnation method, however, is of most purpose to demonstrate the axis-cylinders. Non-medullated nerve fibres were demonstrated in organs where they had not previously been observed, as in myelitis, scars of the spinal cord, tumors, atrophic optic nerve, multiple sclerosis, and in the cortex of paralytics. Micro-photographs show the excellent results which this method furnishes. It will without question be of considerable service in the histo-pathology of the ear.

BRUEHL.

247. After a description of the development of the olfactory organ, INGERSOLL summarizes his studies of the nose in fishes, frogs, alligators, turtles, birds, dogs, cats, wolves, foxes, bears, beavers, seals, rabbits, guinea-pigs, lions, deer, sheep, cows, pigs, buffaloes, horses, elephants, monkeys, and man, as follows: The olfactory organ in fishes consists of two sac-like structures, each of which communicates with the exterior by two openings, but the nasal cavities do not communicate with the mouth. The turbinals are represented by prominences on the medial wall. In dipnoi, the nasal cavities open into the mouth. In reptiles, the nasal cavities are subdivided into olfactory and respiratory regions and the turbinal structures are more highly developed. The secondary palate separates the posterior nares from the mouth. In birds, the turbinal structures are all the more complicated and the ethmoidal turbinals especially show a still higher degree of development. In macrosmatic animals (with acute sense of smell), the turbinals are exceedingly complicated scrolls forming intricate labyrinths. The accessory cavities of the nose all contain olfactory turbinals. In microsmatic animals (without acute sense of smell), the turbinals show evidences of degeneration or reversion and are simple structures. The accessory cavities contain little or no turbinal tissue. It seems, therefore, that in man the accessory cavities of the nose are rudimentary structures. The paper is accompanied by seventeen

plates illustrating these relations in the turtle, duck, dog, and man.

M. TOEPLITZ.

248. The measurements of the skulls and palates of 514 skulls, with good teeth, of living adults show plainly that there is a co-relation between the form of the facial skeleton, of the bony entrance of the nose, and of the hard palate, and also the presence of a leptoprosopé and of a chamæprosopé type of facial skull. The leptoprosopé type, associated with a high, narrow bony entrance of the nose, shows a high, narrow palate, with correspondingly narrow alveolar arch (want of room for the teeth of the second dentition, anomalies in the position of the teeth, V-shaped bend of the alveolar arch), while the chamæprosopé shows the broader conditions as regards the bony entrance of the nose, palate, and alveolar arch. As adenoid vegetations and hyperæmia of the nasal mucosa more readily occlude the narrow respiratory fissures of the leptoprosopes, and do not produce this effect so readily on the broad respiratory fissures of the chamæprosopes, we find more frequent mouth-breathing resulting from adenoid vegetations in leptoprosopes than in chamæprosopes. The occurrence of mouth-breathing with a high palate, narrow and deviated alveolar arch, is most easily explained by the co-relation in the development of the face, so that measurements of the mouth-breathers with adenoid vegetations usually show a high palate and narrow alveolar arch. The anatomic relations contradict the possibility of a compressing influence of the slightly relaxed muscles of mastication and of the cheeks on the facial skeleton, and an influence exerted by these on the form of facial skeleton in mouth-breathers.

ALBANUS.

249. Up to the present time cartilaginous tissue has been observed by a few authors only in the faucial tonsils. The author has examined a large number of pharyngeal tonsils with the microscope. In forty-five pharyngeal tonsils cartilaginous tissue was found in four. All of these four tonsils were removed from cadavers belonging to children from one to ten months of age.

SACHER.

250. Descriptions and illustrations of two instruments: a centrifuge with a dynamic goniometer and a static goniometer. With the centrifuge, rotations of the patient can be produced in a sitting posture, in dorsal decubitus, or when lying on the side.

The static goniometer shows whether the patient is able to continue in an upright position (a board which can be elevated on which the patient stands; the angle to which the patient falls in a forward, sideways, or backward direction can be measured). The dynamic goniometer consists of a dial which is attached to the back of the neck, which shows during rotation on the centrifuge deviations to the right or to the left. Two cases are cited (1, disturbance in the organ of the saccule which governs movements in the vertical direction—*asynnergia saccularis incompleta*; and 2, *hyperæsthesia*) which show the diagnostic and therapeutic importance which the centrifuge and the goniometer have both for the otologist and the neurologist. BRUEHL.

251. In a paper meant principally for singers and teachers of singing, the following questions are raised: How does the voice originate? and in what way is it possible for us to produce a change in its intensity, pitch, or timbre? The author shows the dependence of the development of the voice and the formation of the timbre on the ear, and emphasizes the importance of thorough respiration which can be acquired by imitation of a good singer, preferably one of the same pitch. The physical laws of the formation of the voice are exhaustively described. The author warns against the custom of the singing schools to obtain a stationary condition of the chest and of the apices of the lungs. In conclusion the important points for the production of the voice are collected as follows: 1. The respiratory process, the usual deep respiration, is no different for the requirements of the singer and of the speaker than for all other persons. It is, of course, necessary that respiration should be properly performed. 2. Respiration is, of course, a reflex process which begins independently from birth. The kind and manner of respiration depend upon the demands made upon them. 3. Singers and speakers must learn to breathe sufficiently deep at the proper periods and during expiration to make use of the air in the most profitable manner. 4. To properly develop and preserve the voice, a necessity is good hearing, which must be trained in a particular manner for the musician. 5. The method of the formation of sound must in all cases take place in the larynx. The pitch depends only upon the tension of the laryngeal muscles. 6. The clang tint of the voice in singing and speaking depends upon the various adaptations of the mouth-piece and solely upon this as far as it is influenced by the will. The same

holds true for the vowels and consonants. 7. It is self-evident that in singing and speaking respiration, larynx, and mouth-piece are never used separately but all conjointly. 8. Practically the adaptation of the larynx can only be excited and controlled by way of the ear. For the lips, jaws, tongue, and palate, in addition to the hearing, we have also the sensation of position as well as the control with the eye. BRUEHL.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

252. GRUNERT and DALLMANN (Halle). *Annual Report of the Royal University Ear Clinic in Halle, from April 1, 1903, to March 31, 1904. A. f. O.*, vol. lxii., p. 74.

252. After the usual statistics of the number of patients and diseases, 7 cases are reported with many features of interest. These were cases of sinus and bulb thrombosis. In 5 the operation for bulb thrombosis of Grunert was practised. In 2 cases the operation on the sinus with irrigation of the bulb from the exposed jugular vein resulted in recovery. One case of healed abscess of the temporal lobe and of the cerebellum is reported in which the symptoms, as well as the result of lumbar puncture (clouded fluid with increased leucocytes) suggested a leptomeningitis. The subsequent course led to exposure of the cerebellum and of the temporal lobe, which was at first without result. Subsequently pus was evacuated through the incision. Of the 17 fatal cases during this year, 15 are fully reported. In 3, death occurred independently of the aural condition, in 1 following uræmia, miliary tuberculosis, leptomeningitis. In the remaining 14 cases where death followed the ear lesion, the immediate cause of death was: in 6 cases leptomeningitis, in 4 pyæmic metastases, in 2 sepsis, 1 miliary tuberculosis, and 1 cardiac weakness. The individual features should be read in the original. We shall only draw attention to 3 cases which were of peculiar interest. Case 1.—Rapid septic course of an acute otitis due to streptococcus infection with an extensive thrombus of the sinus and of the bulb. Death followed eighteen days after the onset of the aural lesion. The condition which resembles meningitis and the intrameningeal hemorrhages which were found at autopsy were the result of a severe disturbance of circulation in the brain. Case 7.—In purulent thrombophlebitis

after chronic purulent otitis, lumbar puncture showed a yellowish fluid containing streptococci and suggested a leptomeningitis. Autopsy did not reveal any signs of a purulent meningitis but only spinal leptomeningitis, produced by a deep abscess starting from the ear and passing into the spinal canal by way of the intervertebral foramina. Case 15.—In a chronic middle-ear supuration, with central perforation of the drum and without any signs of a severe destructive process in the bone and sinuses, thrombosis developed and a cerebral abscess. No operation. Death. The case was first explained by autopsy. The table of mastoid operations at the conclusion of the report shows that 136 operations have been performed. HAENEL.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

253. DENKER (Erlangen). On the hearing and frequency of infectious diseases in childhood and in adolescence, from personal observations. *Zeitschr. f. Medisinal-beamte*, 1904, 15.

254. NADOLECZNY (München). On diseases of the middle ear in measles. *Fahrbuch für Kinderheilkunde*, n. F., vol. ix., Ergänzungsheft.

255. SUGER (Budapest). Acute poisoning with anilin after the employment of a local anæsthetic in the ear. *A. f. O.*, vol. lxii., p. 248.

256. TREITEL (Berlin). On disturbances of hearing for music and for conversation. *Deutsche med. Wochenschr.*, 1904.

257. JAENICKE (Berlin). Hearing for voice in idiots. *Medisin. pädag. M. f. d. ges. Sprachheilkunde*, 1904.

258. HECKEL (Paris). Neurasthenic deafness following a mild lesion of the Eustachian tube. *Arch. internat. d'otol.*, etc., vol. xviii., 1904, p. 135.

259. CORNING. The suppression of rotary vertigo; its bearing on the prevention and cure of seasickness. *N. Y. Med. Jour.*, Aug. 13th.

260. BEST. Boric-acid poisoning. *Amer. Med. Assoc.*, Sept. 17, 1904.

261. LAUDER. An inquiry into the source of scarlatinal infection and its bearing upon hospital treatment. *Lancet*, March 12, 1904.

253. Four thousand seven hundred and sixteen schools were examined—high schools and elementary schools. About the same percentage occurred for measles, diphtheria, meningitis, and mouth-breathing in both schools. There was a difference in purulent otitis, scarlet-fever, and influenza—in the high schools 8.6 % while 12.8 % of purulent otitis in the elementary schools,—due to social and hygienic conditions of the lower classes of the population. In the high schools 21.8 % were affected with scarlet-fever and in the elementary schools 11.7 %. A greater number were affected from influenza in the high schools than

in the elementary schools, 35.7 %, 15.3 %. A cause for this is found in the advanced age of the scholars in the high schools, in which the children are not so liable to an infection with measles as with scarlet-fever or influenza. Of 9243 ears which were examined, 75 % were normal. The author believes that properly trained teachers should undertake hearing examinations in their classes, and that all children who hear the whisper voice in less than 2 metres should be taken to the aurist. Children with fetid otorrhœa should not be admitted to schools. BRUEHL.

254. The author was able to examine the ears in a large epidemic of measles with a mortality of 3 % in 100 children varying in age from five months to ten years; 59.5 % of all the patients with measles suffered from acute inflammatory middle-ear diseases. According to the author, the aural lesion is the most frequent complication of measles. The ear disease begins generally in the first two weeks after the eruption, occasionally in the prodromal period, and rarely at the time of desquamation. The author believes this to show that the otitis in measles is primarily of nasal origin. The duration of the inflammatory appearances in the drum was in the acute tympanic catarrh, on an average, eleven days; in a suppuration, about three weeks. Hemorrhages or similar appearances in the drum membrane were observed in the course of the mastoid process, as well as dangerous complications of otitic nature. The diseases of the internal ear were not observed. Other complications in measles, such as pneumonia and severe bronchitis, were generally associated with aural disease. The treatment of the suppuration is best made by the use of hydrogen peroxid. The purulent discharge is forced out by this agent. SUCKSTORFF.

255. The author has observed, after the use of the well-known Gray's mixture to anæsthetize the middle ear of a child nine years of age in order to remove granulations from the tympanum, an acute anilin poisoning, and consequently advocates caution in the use of this agent. Orthoform and anæsthesin are also poisonous, because they are anilin derivatives, and should be used cautiously, especially in children. The author is especially opposed to the oily solution of anæsthesin as advocated by Haug. HAENEL.

256. In a short communication, TREITEL describes two personal and a number of other observations of disturbances of

hearing for music and for the voice, and cites the opinions of the older authors. Most of these are agreed that a disturbance occurs in the nerve-end apparatus as a consequence of the middle-ear suppuration.

NOLTENIUS.

257. The author deduces the following conclusions:

1. The feeble-minded child is often regarded as deaf because it cannot make use of its peripheric hearing on account of mental and vocal backwardness.

2. The education of these idiotic children should seek to improve the peripheric hearing and also to develop the central hearing for voice.

3. This is possible through the voice, so that the education must consist of rational instruction in articulation and observation.

4. This instruction is an integral part of the methods of instruction and does not require special appliances for the so-called deaf children.

The author, therefore, apparently is of the opinion that the pupils to be found in classes for the deaf are really not deaf, but only feeble-minded. He does not appear to have much confidence in the medical judgment.

BRUEHL.

258. A neurasthenic female patient, twenty-seven years of age, suffered from bilateral deafness, which was regarded by a number of specialists as incurable on account of a dry middle-ear catarrh. The patient was cured by general treatment. The author, therefore, speaks of a neurasthenic deafness.

OPPIKOFEK.

259. Experiments were carried out on artificially induced vertigo by means of a revolving chair. The drugs of most value were found to be hyoscin and opium or morphin. Hyoscin hydrobromid, $\frac{1}{16}$ gr., and opium, $\frac{1}{4}$ gr., were effective. The drugs rendered the patient proof against giddiness and nausea for from three to four hours, while a tablet of morphin, $\frac{1}{4}$ gr., extract of cannabis indica, $\frac{1}{4}$ gr., nitroglycerin, $\frac{1}{8}$ gr., strychnin sulph., $\frac{1}{16}$ gr., resorcin, 1 gr., cocain hydrochlorid, $\frac{1}{4}$ gr., was sufficient to continue the immunity for a like period.

W. SOHIER BRYANT.

260. The author reports one case in addition to four fatal and five cases of severe intoxication found in literature. Best's case was operated on for lymphadenitis and 6 oz. of boric-acid

powder were placed in the wound, which was sealed up without drainage. On the evening of the third day a diffuse erythematous and slightly papular rash appeared on the neck, chest, and shoulders, which increased. On the fourth day, marked cyanosis, vomiting, delirium; temperature 100.8°; death. BRYANT.

261. LAUDER, in an extremely able paper, brings forward evidence to show that "return cases" of scarlet-fever are not attributable to the peeling condition, but mainly to undetected discharges from the respiratory passages and ears in those who have left the hospital. CHEATLE.

C.—METHODS OF EXAMINATION AND TREATMENT.

262. OSTMANN (Marburg). A series of mounted tuning-forks for an objective hearing measure. *A. f. O.*, vol. lxii., p. 53.

263. OSTMANN (Marburg). Enlargement of my tables on the hearing function to tables of sensitiveness of the deaf ear. *A. f. O.*, vol. lxii., p. 48.

264. OSTMANN (Marburg). Clinical studies on the analysis of disturbances of hearing. Part III: The curve of sensibility in the ear deaf from cerumen. *A. f. O.*, vol. lxii., p. 26.

265. MIGNON (Nizza). Examination of the bony cavities of the skull with the tuning-fork. *Annales des maladies de l'oreille*, etc., 1904.

266. HAMMERSCHLAG (Vienna). On simulation of ear disease in regard to accidental injuries of the ear. Wien, 1904, *Verlag von Moritz Perles*, p. 80.

267. VOSS. A practical apparatus to be used in catheterizing in ear disease. *Deutsche med. Wochenschr.*, No. 29, 1904.

268. BERNOUD. The treatment of deafness with insufflations of hot air. *Wiener med. Blätter*, No. 39, 1904.

269. BABINSKI (Paris). The treatment of affections of the ear, and especially of all vertigo, by lumbar puncture. *Annales des maladies de l'oreille*, etc., 1904, Feb.

270. WAGNER (Vienna). On the treatment of endemic cretinism with thyroid-gland substance. *Wiener klin. Wochenschrift*, No. 30, 1904.

271. MÜLLER (Hamburg). On the use of suprarenalin and adrenalin in hemorrhage. *Wiener klin. Rundschau*, No. 35, 1904.

272. TRAUTMANN (München). A new modified reflector. *Münchener med. Wochenschr.*, 1904, No. 29.

273. COLLET (Lyons). Salpingoscopy. *Annales des maladies de l'oreille*, etc., 1904, Jan.

274. BRUNDSCHVIG (Havre). A malleus extractor. *Annales des maladies de l'oreille*, etc., 1904, Jan.

275. GRÜNWALD (München). Several new instruments. *Arch. f. Laryngol.*, vol. xvi., part 1.

276. VOSS. A new cutting forceps for the nose. (Ohrenklinik d. Kgl. Charité, Berlin.) *Münchener med. Wochenschr.*, 1904, No. 31.

277. TAPTAS (Constantinople), **On narcosis with bromethyl.** *Arch. internat. d'otol.*, etc., vol. xviii., 1904, p. 215.

262. The following precautions are necessary in the use of tuning-forks as an objective hearing measure :

1. The equally tuned forks must possess the same medium intensity.
2. The dampening of each individual fork must be known.
3. The dampening necessary for each fork must always be the same.
4. The physician and patient should observe the dying-out of the fork always under the same conditions.
5. The source of errors produced by fatigue of the ear must be reckoned with.

As condition 1 is not regarded in the use of Edelman's forks, the author has had tuning-forks produced by a Marburg firm, under his personal supervision. Each fork has a table of corrections for its corresponding dampening. Condition 3 is met by a firm mount for the forks ; conditions 4 and 5 by practical appliances in the mounting.

HAENEL.

263. The author has extended his tables on the examination of the hearing to include tables on the sensitiveness of the deaf ear, so that the investigator, immediately after having determined the different time, may read off from the tables the logarithmic sensitiveness of the deaf ear for the tone examined for.

HAENEL.

264. In the "Hearing Relief" of the author, published in *A. f. O.*, vol. lxi., p. 137, the normal sensitiveness for the varying pitch has been incorrectly placed as equal to 1. This error has been corrected by substituting the values found by Wien. According to the curve of Wien for the logarithmic sensitiveness of the normal ear, the author has constructed curves of the logarithmic sensitiveness of disturbances of hearing produced by cerumen, and concludes as follows :

1. The course of the curve of sensitiveness of the ear deaf from cerumen is typical.
2. The typical course is characterized by the fact that the sensitiveness for all tones between C and c^4 sinks more for the high tones than for the low ones.
3. Notwithstanding the marked diminution of sensitiveness in the high octaves, the sensitiveness remains greater for these than

for the low octaves, because the normal sensitiveness for the former is unusually larger than for the latter.

4. This fact mentioned under 3 explains how, notwithstanding incorrect premises and an incorrect measure of hearing, we do not arrive at any incorrect differential diagnostic conclusions.

5. The course of the curve of sensibility of the ear deaf from cerumen is sufficiently determined by the measure of hearing of the two forks, C and c⁴. It is thus possible to determine the curve in a few minutes.

In conclusion, OSTMANN gives the curve of sensibility of an ear deaf from labyrinth disease and after loss of hammer and anvil.

HAENEL.

265. If the mastoid antrum, the frontal sinus, or the maxillary sinus contain fluid, a vibrating tuning-fork placed upon one of these cavities will be heard less distinctly than on the other side, when a phonendoscope is placed over the cavity next to the tuning-fork, due to the diminished resonance of the air enclosed in the cavity. This method is apparently an improvement on the auditory and optic methods of demonstrating fluid in the skull cavities. Unfortunately it appears to be least advantageous in the case of the sinus frontalis, where it would be most valuable.

BOENNINGHAUS.

266. HAMMERSCHLAG, in this paper, gives a complete description and criticism on the methods of examination for simulation.

HARTMANN.

267. In the Charité Ear Clinic, in Berlin, an apparatus is employed, which was made by Détert, which consists of a cylinder, capable of standing three atmospheres of pressure, into which filtered air is forced by a hand pump. The quantity of air necessary for catheterizing is obtained by a bulb-like arrangement, which reduces it to the desired force. Two manometers, one at the cylinder and one at the valve, show the quantity of fluid contained. The apparatus is apparently serviceable, though the relatively high price of \$16 may prevent it from becoming popular.

NOLTENIUS.

268. In sclerosis, BERNOUD insufflates hot air with an apparatus of Beek's. The air passes through a metal cylinder, which contains an electric lamp. The temperature can be regulated. The author, who is himself very sceptical, states that tinnitus disappears and a small improvement in hearing takes place.

WANNER.

269. In 106 patients in the Hôpital de la Pitié suffering from labyrinth symptoms, partly primary and partly secondary to sclerosis or old otitis media, BABINSKI has attempted to diminish the symptoms by lumbar puncture. He was successful to an astonishing degree in the case of vertigo, especially primary labyrinthine vertigo. Vertigo existing for months, or even years, disappeared after one or rarely repeated punctures evacuating 15-20 ccm. The hearing, which had been absent for many years, was so much improved in two cases that the ordinary voice could be heard at the ear. The paper contains no case histories; these are all collected in the dissertation of Lumineau. The author is not an aurist, but is well known by his valuable papers on galvanic-aural vertigo. The examinations of the ears have been made by an aurist, Dr. Weill. It is clear that lumbar puncture would relieve intralabyrinthine pressure on account of the pressure between the labyrinth lymph spaces and the lymph spaces of the skull. That lumbar puncture should, however, produce such results, and apparently permanent results, in old and severe disturbances of the labyrinth is remarkable.

BOENNINGHAUS.

270. Seventy-two cretins were treated, showing the advantages of the treatment. Even in endemic cretinism—the case came from Steiermark—after treatment continued for months or years, an increase in the growth was noticed to a marked degree. In endemic cretinism, according to these observations, there is also a retardation in the formation of bone and cartilage, and retarded ossification of the epiphyses. With the increase of growth there is a simultaneous loss of flesh from a disturbance of the cutaneous swellings. The mental condition was improved; some of the children could attend school. A decidedly favorable influence was exerted on the speech and hearing. The thyroid tumors diminished and the children lost the typical physiognomy. Usually one thyroid-gland tablet was given every day and continued for several years.

WANNER.

271. MÜLLER describes the gauze, cotton, and tampons made after his suggestions, which are sterile and contain a certain amount of stable adrenalin and suprarenalin. The gauze contains $\frac{1}{4}$ –1%, the cotton 1 to 1000, the tampons contain both ingredients. The hemorrhage dissolves the suprarenalin and the adrenalin, and the action then takes place.

The maximum internal dose is 1ccm of a $\frac{1}{1000}$ solution. A result is usually obtained in doses from 0.0001 to 0.00075g.

WANNER.

272. The opening for the eye is situated at the margin of the mirror. The author has used this reflector for many years now with satisfaction.

SCHEIBE.

273. COLLET has investigated the salpingoscopy of Valentine, which consists in the examination of the opening of the Eustachian tube with a cystoscope, which is passed through the nose. The method permits a deep survey of the tubal ostium, though it is inferior to posterior rhinoscopy as it does not furnish as good a picture of the naso-pharynx.

BOENNINGHAUS.

274. The author has modified Delstanche's ring-knife with a harpoon-like appliance which, after the tensor has been divided with the ring-knife, grasps the hammer and facilitates its rapid removal. This simple instrument appears to be practical.

BOENNINGHAUS.

275. 1. A forceps for polypi and similar to a bone forceps with broad blades.

2. To remove the internal wall of the maxillary sinus a chisel is suggested with two cutting edges.

3. To retract the upper flap during the operation on the maxillary sinus.

ALBANUS.

276. The forceps grasp large pieces and do not interfere with the field of operation.

SCHEIBE.

277. TAPTAS recommends narcosis with bromethyl to remove faucial or pharyngeal tonsils in nervous individuals. Adults are tied to a specially constructed chair.

OPPIKOFER.

d.—DEAFMUTISM.

278. KLUG (Budapest). Examination of a patient without labyrinth. *Annales des maladies de l'oreille*, etc., 1904, Jan.

278. Bilateral necrosis of the labyrinth has thus far only been observed three times. KLUG has observed a fourth case in a child six years of age after scarlet-fever. After removal of the sequestrum the child recovered, though of course deaf and became mute. In this child the author observed static symptoms of defect which are presented by a number of deaf-mutes: uncertain gait with closed eyes, lack of orientation in the bath, the

absence of rotatory vertigo and galvanic vertigo. A short and clear review of our present physiological knowledge on the static apparatus, with literature. BOENNINGHAUS.

EXTERNAL EAR.

279. BING (Vienna). On congenital aural fistula. *Wiener klin. Rundschau*, No. 33, 1904.

280. SCHEIBE. On congenital bilateral atresia of the auditory canal. *Münchener mediz. Wochenschrift*, No. 2, 1904.

281. OELHAFEN. Foreign body in the ear. *Münchener mediz. Wochenschr.*, 1904, No. 27.

282. MANCIOLI (Rome). The tympanic membrane and the detonations of firearms. *Arch. internat. d'otol.*, etc., vol. xviii., p. 504.

279. Among a number of cases observed by BING there was one in which, in addition to a bilateral suppurating fistula, there was a fistula on the left side of the neck which also discharged moderately. WANNER.

280. In this patient it was possible to produce an artificial meatus. As in these cases not only the auditory canal but the os tympanicum and the drum membrane are absent, the mastoid antrum was opened, and the field of operation was kept open by transplanted skin flaps. Conversational voice, which was heard before the operation at a distance of 10cm, was later heard at 18cm. Hearing was especially improved for noise, hearing for deep tones had improved by two octaves. HARTMANN.

281. A living flea in the ear which had produced pain and vertigo. SCHEIBE.

282. After experimental investigations, MANCIOLI concludes that detonation produces rupture of the drum membranes only in ears which have had previous ear trouble and never in healthy ears. Experiments were performed as follows: The auricles of four rabbits were fixed and a speculum was introduced into the meatus in order to straighten the canal. Then at varying distances from the ear (50-0.25cm) and in different positions shots were fired. In all four cases the drum remained intact. OPPIKOFEK.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

283. HECKEL (Paris). Physical and clinical proofs of the non-existence of a cavity in an inflamed middle-ear. *Arch. internat. d'otol.*, etc., vol. xviii., 1904, p. 190.

284. TAPTAS (Constantinople). On acute latent suppurating mastoiditis as a complication of acute catarrhal otitis of the middle ear. *Arch. internat. d'otol.*, etc., 1904, vol. xviii., p. 477.

285. BÜRKNER (Göttingen). On the question of paracentesis. *A. f. O.*, vol. lxii., p. 177.

286. PANSE (Dresden). On the operative treatment of aural inflammation. *Münchener med. Wochenschr.*, 1904, No. 27.

287. HEERMANN (Kiel). The importance of the actual question of the treatment of acute otitis media for the general physician. *Sammlung swangl. Abhandlungen*, viii., 2.

288. SEGURA (Buenos Ayres). A case of bilateral Bezold's mastoiditis; operation; recovery. *Annales des maladies de l'oreille*, etc., Feb., 1904.

289. KOBRAK (Breslau). On middle-ear diphtheria without the formation of membranes. *A. f. O.*, vol. lxii., p. 11.

290. STENGER (Königsberg). On the importance of enlarged cervical glands in purulent otitis. *A. f. O.*, vol. lxii., p. 211.

291. URBANTSCHITSCH (Vienna). On otitic gravitation abscess. *Wiener med. Presse*, Nos. 12, 13, 1904.

292. GRADENIGO (Turin). Circumscribed leptomeningitis with spinal symptoms and on paralysis of the abducens nerve of otitic origin. *A. f. O.*, vol. lxii., p. 255.

293. RICCI (Trevito). A case of paralysis of the abducens nerve of otitic origin. *Archivio italiano di otologia*, etc., vol. xv., part 6.

283. If during the course of an acute otitis media the drum membrane sinks inward, this phenomenon does not depend upon an empty cavity in the middle ear, but upon the contraction of the tensor-tympani muscle which has been invaded by inflammation extending from the tube to the middle ear. **OPPIKOFEK.**

284. Six case-histories are furnished to show the well-known fact that an otitis media can lead to mastoiditis or to endocranial complications without having perforated. **OPPIKOFEK.**

285. Forty-four cases of acute otitis media have been treated according to the method advocated by Zaufal and Piff. The results were very unfavorable. A review of the cases of acute purulent otitis observed by the author during the last ten years shows the favorable course of the cases in which a paracentesis had been done. Those in which an early paracentesis had been performed, as a rule, were characterized by a shorter period of illness than those in which a spontaneous perforation had taken place, and complications, relapses, disturbances of function, persistent perforations, were observed more rarely.

HAENEL.

286. Care must be taken for free discharge of pus, the canals

should be dried, applications made with solution of silver nitrate, insufflation with a little iodoform boric acid or pure boric acid and packing. If the mastoid process be tender at first, ice-bag. The aural douche which, according to the experience of the reviewer, distinctly diminishes the duration, is not mentioned. PANSE objects to irrigation because it macerates the skin. It is, however, not clear to the reviewer why an irrigation lasting only a few seconds should soften the skin more than the pus which is in constant contact with the skin. It is without doubt true that the canal can be cleaned much more thoroughly by irrigation than by drying. Panse further remarks that syringing is unnecessary because pus escapes from the canal as from a drainage tube. The author does not state that his method of treatment is better than others. The objections are usually of a theoretic character which are advanced and are usually due to a misconception of surgical principles. A suppuration from the middle ear is compared to a wound. Wounds should not be tamponed, why, therefore, a purulent cavity? No surgeon will fill his drainage tube with packing. It is surely time that the introduction of gauze into the canal and tympanum should be abolished and that irrigations should be given their old position. The latter have never injured, which cannot be said of the former, as Bezold has shown.

SCHEIBE.

287. The author is of the opinion that the general practitioner should help in solving the question of the proper treatment of acute purulent otitis, and should not keep his observations to himself, but should publish them. It seems that the author pays more attention to the general symptoms in acute otitis media than to the local manifestations. It need only be stated that in ninety-seven per cent. of his cases paracentesis was not performed. He distinguishes between an otitis media in atrophic sucklings and an acute otitis media. As this paper is meant for the practising physician, terms should have been used with greater precision. I do not believe that a general physician will be able to decide what he shall do from this paper of HEERMANN'S. BRUEHL.

288. This case of a man sixty-five years of age, suffering from influenza, is probably unique on account of its bilateral feature. Otherwise the rapid disintegration of the intervening bony septa between the mastoid cells and the vitreous table is of interest, which should have suggested an examination for sugar.

BOENNINGHAUS.

289. This communication of KOBRAK's shows the importance of bacteriological examination of the discharge in an acute otitis, especially for the recognition of aural diphtheria. By careful bacteriological examination, two cases of apparently uncomplicated acute otitis were proved to be acute middle-ear diphtheria; and, on the other hand, a case of middle-ear suppuration which was regarded as diphtheria proved not to be so. One of these cases must be regarded as a primary aural diphtheria.

HAENEL.

290. This observation shows that the glands situated behind the sterno-mastoid muscle below the mastoid process in the splenius are rarely involved in acute purulent otitis, but regularly in cases in which the mastoid process is early and deeply involved. The author regards a swelling of these glands in the course of an acute middle-ear suppuration as a valuable symptom to diagnose diseases of the mastoid process. It is, of course, necessary to exclude infection from the scalp with its influence on the glands of the neck.

HAENEL.

291. After describing two personally observed cases of otitic gravitation abscess, the author gives the anatomic path of these abscesses and quotes cases from literature.

BRUEHL.

292. From five personally observed cases and eight collected out of literature, GRADENIGO describes a clinical picture which is characterized by persistent pain in the region of the temporal and parietal bones, with simultaneous paralysis of the abducens nerve in the course of an acute purulent otitis. Agreeing with Habermann and Brieger, he believes this symptom-complex to be the expression of a circumscribed purulent leptomeningitis. These cases generally recover either spontaneously or after operations on the drum or on the mastoid process. Under certain conditions the meningitis extends and causes death (case of Katz and Case 5 of Gradenigo). The latter case is also remarkable on account of the localization of the leptomeningitis in the spinal canal, which is explained by the patient remaining out of bed as the disease ran a latent course (extension of the meningitis to the most dependent parts of the nervous system). Another proof for this spinal localization of an otitic meningitis is furnished by the case of another patient who did not go to bed until late on account of the mild course of the disease.

HAENEL.

293. As in the cases reviewed in the preceding volume of these ARCHIVES, in this case of a patient forty-three years of age, two and a half months after the onset of an acute inflammation of the middle ear, diplopia set in from paralysis of the abducens nerve, which disappeared completely in two months.

RIMINI.

b.—CHRONIC PURULENT OTITIS.

294. ALEXANDER (Vienna). On the radical treatment of peripheral facial paralysis; suture of the facial to the hypoglossal nerve. *A. f. O.*, vol. lxii., p. 1.

295. ROZIER (Pau). A case of otitis at the floor of the tympanum and at the horizontal semicircular canal; recovery. *Annales des maladies de l'oreille*, etc., 1904, Mars.

294. In facial paralysis of six years' duration, following chronic suppurative otitis, ALEXANDER sutured the facial trunk to the hypoglossal nerve. Six weeks after the operation no functional improvement could be discovered.

The previously published eleven cases of operative treatment of facial paralysis are reviewed. Three methods have been followed: 1. Suture of the divided peripheral facial trunk to the spinal accessory nerve. 2. End-to-end suture of the divided peripheral facial nerve to the divided proximal end of the hypoglossal nerve. 3. Suture of the divided facial trunk to the hypoglossal nerve. This latter method is the one favored by the author. A permanent interference in the motility of the tongue, as was observed in the case of Körte, was avoided. As an indication for operation the electrical reaction of the facial nerve before operation is most important.

HAENEL.

295. ROZIER, known by his studies on the floor of the tympanum, describes a case in which at the radical operation on the floor of the tympanum a large cavity was found, which extended in the form of a hypotympanic area under the promontory and the pyramid, whose walls were rough. Curettage and injury to the facial nerve. Later a sequestrum separated and an opening into the horizontal semicircular canal resulted. This was followed by vertigo on rotation towards the affected side; bone-conduction prolonged as before. The labyrinth was not infected from the opened-up semicircular canal, nor has this complication followed accidental opening of the semicircular canal in the radical operation.

BOENNINGHAUS.

C.—CEREBRAL COMPLICATIONS.

296. DELSAUX. Relapsing cerebral abscess. *La presse oto-laryngologique Belge*, 1904, part 7.
297. DELSAUX. Cerebellar abscess without external signs. *Ibid.*
298. HINSBERG. Otitic cerebellar abscess: infection through the hiatus subarcuatus. *Deutsche mediz. Wochenschr.*, No. 39, 1904.
299. CABOCHÉ (Paris). Cerebellar abscess, parietal thrombus of the lateral sinus; operation; recovery. *Annales des maladies de l'oreille*, etc., 1904, Mars.
300. MUELLER (Berlin). Complications of purulent otitis. *Fortschritte der Medizin*, No. 22, 1904.
301. FRIEDRICH (Kiel). On the surgical treatment of otitic purulent cerebro-spinal meningitis. *Deutsche med. Wochenschr.*, No. 32, 1904.
302. ALMERINI (Turin). Clinical contributions on otitic pyæmia without sinus thrombosis. *Archivio italiano di otologia*, etc., vol. xvi., part 1.
303. LUC (Paris). A case of sinus thrombosis. *Annales des maladies de l'oreille*, Feb., 1904.
304. DE CARLI (Rome). Phlebitis and periphlebitis of the lateral sinus, and thrombosis of the longitudinal sinus. *Archivio italiano di otologia*, etc., vol. xv., part 6.
305. DELSAUX. Thrombo-phlebitis of the cavernous sinus of otitic origin. *La presse oto-laryngologique Belge*, 1904, part 9.
306. LOMBARD (Paris). A case of purulent thrombosis of the cavernous sinus. *Annales des maladies de l'oreille*, etc., Feb., 1904.
307. TOUBERT. Influence of the time of operation on the final result in cases of thrombo-phlebitis of the lateral sinus. *Arch. internat. d'otol.*, vol. xviii., p. 437, 1904.
308. JUERGENS (Warsaw). On otitic septico-pyæmia. *La presse oto-laryngologique Belge*, part 8, 1904.
309. WESSELOWSOROW. On the complications of purulent inflammations of the middle ear. *Inaug. Diss.*, St. Petersburg, 1904.

296. A case of relapsing brain abscess is described and demonstrates not only the course of relapses, but also that in brain tissue, just as in other tissues, a scar formation takes place, and that lumbar puncture and an examination of the eye-grounds cannot furnish an indication for operation. BRANDT.

297. A man died of an otitic cerebellar abscess without showing any other symptoms beyond brain pressure. Operation was refused. Lumbar puncture and an examination of the eye-grounds were not made. No vertigo, no ataxia. The symptoms which Schwartzé has described as characteristic for cerebellar abscess may be absent. In this case the middle cranial fossa was first exposed and the brain punctured. At autopsy the cerebrum was found normal. BRANDT.

298. The author gives an abstract of five previously published cases in which the hiatus subarcuatus or its contents (blood-vessels and surrounding connective tissue) was regarded with considerable probability as the mode of extension of a purulent inflammation, if an infection passed from the mastoid antrum to the cerebellar dura, and last to the cerebellar abscess. Two personally observed cases are then described where a similar condition was found present. In both cases it was possible to follow the path of infection by a microscopic examination. Especially in the first case was this possible as the canal, though possessing smooth walls and no trace of necrosis, showed marked pathological changes in the arteries and the connective tissue which it contained. The disease, therefore, extended without interruption from the antrum to the posterior surface of the pyramid, and finally to the cerebellar abscess. Another method of origin, as, for instance, sinus thrombosis or labyrinth suppuration, could be excluded with certainty. The second similar case is less instructive, as the vessels and the connective tissue in the course of the canalis subarcuatus presented no pathological changes. Even in this case any other path of infection could be excluded according to the author. Hence it is assumed that infectious material passed in the vessels from the mucous membrane of the diseased mastoid cells and infected the dura, and an inflammatory process developed, which in turn led to the formation of a cerebellar abscess, though the hiatus itself showed no trace of this process. The opening of the hiatus subarcuatus at the posterior surface of the pyramid makes it necessary for the disease in this locality to lead to pathological changes in the cerebellar fossa, very rarely to disease in the middle cranial fossa. It is also of interest that in the seven reported cases the disease in five affected the left hiatus subarcuatus. MOLTENIUS.

299. After the radical operation, where the dura and sinus wall were found normal, symptoms of increased intracranial pressure gradually developed without any focal symptoms. Another operation was undertaken two weeks later. Puncture of the cerebrum was negative. Puncture of the cerebellum evacuated pus. The cavity was drained with a rubber drainage-tube. Puncture of the sinus revealed blood, but the blood was slightly clouded. The sinus was, curiously enough, not incised, so that proof for the occurrence of a parietal thrombus was not furnished. BOENNINGHAUS.

300. In the first of two reported cases there was a purulent meningitis after purulent otitis, in which the characteristic meningeal symptoms were wanting, and the picture of the pyæmic sinus phlebitis with chills and articular metastases was simulated. The correct diagnosis was not made until after the autopsy.

The second case was a perizygomatic or epizygomatic abscess in a case of acute otitis media. After incision of the abscess the aural suppuration ceased.

SUCKSTORFF.

301. FRIEDRICH has attempted in two cases to cure a purulent inflammation of the arachnoid space in the vertebral canal and the surrounding parts of the base of the skull by laminectomy—*i. e.*, by resection of one or more lumbar arches after previous opening of the skull and reduction of the original pathological focus. The result in both cases was negative. Notwithstanding, the author hopes that the indications for this operation will be so defined that the operation will be indicated in certain cases. This method of operating is contra-indicated when purulent arachnitis has already affected the convexity of the brain. The author believes that it is possible to distinguish between the diffuse meningitis extending over the convexity of the brain and the local meningitis localized to the vertebral canal and the surrounding areas of the posterior cranial fossa with involvement of the ventricles and the basal cistern. The former, generally caused by a labyrinth suppuration, is characterized by the rapid onset of the well-known symptoms of purulent cerebro-spinal meningitis with high fever, *viz.*, stupor, delirium, rigidity of the neck, spasms, chronic convulsions. The latter form occurs, as a rule, in chronic purulent otitis, with cholesteatoma, in extradural suppurations and brain abscesses, and runs a slower course, so that the organism has time to encapsulate the purulent focus. In these cases the attempt is justified to make a large counteropening at the deepest part of the purulent focus, *viz.*, in the region of the fourth lumbar vertebra, thus removing the purulent fluid from the arachnoidal space by constant and active drainage. If, when this has been done, copious infusions of physiological salt solutions serve to replace the loss of the fluid in the subarachnoidal spaces, the possibility of the irrigation of the subarachnoidal spaces is suggested, based upon the experiment of Cordero, who has attempted to create a subarachnoidal current passing from the brain to the spinal cord.

NOLTENIUS.

302. The author is of the following opinion:

There is unquestionably an otitic pyæmia without sinus thrombosis. It usually arises after acute cases under the picture of the so-called osteophlebitis pyæmia of Körner, this resemblance being due to the direct extension of pus cocci in the circulation, possibly from a septic thrombosis of the smaller veins of the temporal bone.

RIMINI.

303. After the day on which the transverse sinus was opened and the disintegrated thrombus evacuated, following a preliminary ligation of the jugular vein, Luc's patient had been perfectly well for five weeks. Then emaciation, headache, vomiting, coma, and death eight days later. No autopsy. All the symptoms point to a cerebral abscess, presumably situated in the cerebellum, induced by the sinus thrombosis. The latent stage of the brain abscess, a condition of which we know very little, must have lasted five weeks.

BOENNINGHAUS.

304. A patient, twenty-three years of age, had suffered from otorrhœa for eighteen years. He was suddenly taken ill with severe rigors and hemicrania. The right mastoid process was opened. The sinus was surrounded with pus; it was incised, and a disintegrated thrombus removed. The jugular was ligated. Death followed after a short time. At autopsy, the purulent thrombus of the right lateral sinus was found, which had extended to the torcular and to the longitudinal sinus.

RIMINI.

305. After a short review of the literature on thrombosis of the cavernous sinus, in the connection of middle-ear disease with the cranial sinuses and the processes of infection, an interesting and fatal case of thrombosis of the cavernous sinus is described, with the following peculiar features: Examination of the eye-grounds revealed no abnormal condition, though later a papillitis was present. Lumbar puncture and the examination of the lumbar fluid have only a relative prognostic importance. There was no fever for a whole week. The thrombus prevented the infection. Why was this barrier overcome? Direct operation of the cavernous sinus shows little prospect of success.

BRANDT.

306. A man suffering from chronic purulent otitis on the right side, and chronic malaria, became ill with a fever of a pyæmic type, with eye symptoms on the right side, characteristic

for thrombosis of the cavernous sinus; protrusion of the eyeballs, œdema of the upper lid, chemosis, immobility of the eyeball, rigidity of the pupils, loss of vision. The process subsequently extended to the left side. Death under the symptoms of meningitis. The autopsy confirmed the diagnosis. In the tympanum there was an old putrid suppuration. Antrum and mastoid cells showed no changes. As the nasal accessory cavities were normal, the right tympanum can be regarded as the origin for the infection of the cavernous sinus. The path for the infection could not be found, as the transverse sinus, including the jugular bulb, the petrosal sinus, and the pericarotid venous plexus were found free from thrombosis and microscopically normal. A microscopic examination of the carotid plexus would probably have revealed the pathway.

BOENNINGHAUS.

307. The favorable results of operative treatment of sinus thrombosis depend more upon an early operation than upon a definite method of operation. As a proof, two hundred cases of sinus thrombosis are collected from literature. One hundred and twenty cases were operated on the first week after the appearance of the intracranial symptoms, with 25 % deaths and 75 % recoveries. The other eighty cases were operated on after one week, with 62.5 % deaths and 37.5 % recoveries.

OPPIKOFER.

308. The so-called radical operation, with resection of the mastoid process and ligation of the jugular and facial veins, does not always give a satisfactory result in otitic pyæmia. The results of serum-therapy are not sufficiently known, especially as in most cases there is a mixed infection. Our treatment is directed in the first place against the main focus, against the aural suppuration, and against the inflammation of the mastoid process. There are, however, a number of cases in which the mastoid process is free from disease, and where the middle ear alone is involved. The drum membrane may in certain cases even have regained its normal appearance, and there is nothing to show that the middle ear, the cervical veins, and the sinus are diseased, though the pyæmia has unquestionably arisen from these foci and is continually increasing.

In this case should the mastoid process be opened, or should the sinus and veins be resected? What results are furnished by an expectant treatment?

As an answer to these questions, the author publishes 11

cases, of which 9 recovered and 2 died. In all cases the operation was refused. His calculations are as follows: In pyæmia we should not operate unless we are sure that a suppuration is present in the mastoid process, or that the sinus or the jugular veins are involved. Abscesses in other parts of the body are favorable from a prognostic sense, and their exposure frequently heals the pyæmia.

BRANDT.

309. A statistical collection and description of 389 cases, which had been observed in this hospital during the last sixteen and a half years.

SACHER.

d.—OTHER AFFECTIONS.

310. SCHIEER (Berlin). An unusual injury of the tympanum. *Münchener med. Wochenschr.*, 1904, No. 35.

311. STEFANOWSKI (Kasan). Myringotomy as a method to improve the hearing in chronic otitis media (adhesive, dry, and sclerotic). *A. f. O.*, vol. lxii., p. 219.

312. SUGAR (Budapest). On the treatment of chronic middle-ear catarrh with thiosinamin. *A. f. O.*, vol. lxii., p. 241.

310. On cleaning the ear with a hairpin, the anvil was extracted. Recovery took place, with closure of the drum and diminution of hearing for whisper to $\frac{1}{2}m$.

SCHEIBE.

311. In 16 cases of chronic otitis media, excision of the drum was practised by the author, combined in 2 cases with removal of the handle of the hammer. This treatment was only followed in cases with negative Rinne, and only after treatment with catheter, massage, and so forth had proved without avail. In 62.5 per cent. after operation the hearing was improved—in all cases there was an improvement of the tinnitus and vertigo. The author is unable to state whether these results are permanent. In one case, after two years, the improvement in hearing had persisted. In all the other cases the period of observation was shorter.

HAENEL.

312. In 8 cases of chronic middle-ear catarrh, and in 2 cases of adherent drum after purulent otitis, thiosinamin was employed with benefit. The author, therefore, recommends this remedy in the beginning of otosclerosis, in adhesive processes after middle-ear suppurations, in syphilitic middle-ear catarrhs—in fact in all cases in which connective-tissue discharges and not osseous adhesions are present. The patients have borne subcutaneous injections well, and also injections through the catheter into the tympanum.

HAENEL.

NERVOUS APPARATUS.

313. VERAGUTH (Zurich). On the treatment of Ménière's vertigo. *Münchener med. Wochenschr.*, 1904, No. 20.

314. EITELBERG (Vienna). Tinnitus in progressive paralysis. *Wiener med. Presse*, No. 29, 1904.

315. ALEXANDER (Vienna) and FRANKL-HOCHWART (Vienna). A case of tumor of the auditory nerve. *Arbeiten aus dem neurol. Institut in Wien*, vol. xi.

316. BRYANT. Treatment of tinnitus aurium. *The Laryngoscope*, July, 1904.

313. Two cases are reported in which vertigo was improved after electricity, iodide of potash, and general treatment. The author is sceptical in regard to the value of the treatment, though he considers that the electricity was of decided benefit.

SCHREIBE.

314. Three cases are described which are not particularly convincing.

WANNER.

315. A man, forty-one years of age, suffered from vertigo, vomiting, headache, dementia, nystagmus, and optic neuritis. Left-sided nervous deafness (Rinne +, Schwabach abbreviated, upper tone-limit diminished). Paralysis of the left facial nerve. Autopsy revealed a tumor in the cerebello-pontal angle connected with the seventh and eighth nerves and extending into the internal auditory meatus. Histologically the tumor proved to be a narrow fibroma. In the labyrinth there was degenerative atrophy of the cochlear branch and the spiral ganglion, with atrophy of Corti's organ and of the stria vascularis, with partial degeneration of the annular band.

BRUEHL.

316. The treatment consists chiefly in relieving the exciting cause, and in most cases treating the faults in the sound-conducting apparatus, which are usually the predisposing cause. The following classification is intended to facilitate the intelligent treatment of the annoying symptom:

I. OBJECTIVE.

(A) VIBRATORY:

1. *External*: (a) Vascular. (b) Pharyngeal. (c) Respiratory. (d) Muscular.

2. *Internal*: (a) Salpingeal. (b) Tympanic.

II. SUBJECTIVE.

(A) PHONETIC.

1. *Exaural*: (a) Vital. (b) Diplacusic.

2. *Endotic*: (a) Circulatory. (b) Myotolitic. (c) Movement. (d) Somatic.

(B) NEUROTIC.

1. *Peripheral*: (a) Reflex.
2. *Otic*: (a) Conduction: I. Myringal. II. Tubal. III. Ossicular. IV. Mucous. V. Contraction. VI. Adhesion. VII. Fenestral. VIII. Traumatic. IX. Meatal. (b) Reaction.
3. *Sensory*: (a) Nerve Tinnitus: I. Peripheral. II. Trunk. III. Proximal. (b) Psychopathic: I. Central. II. Illusional. III. Hallucinational. IV. Delusional.

BRYANT.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

317. FREUND (Strassburg). The changes of the naso-pharynx during gestation and during the puerperium. *Monatsschr. f. Geburtshilfe u. Gynäkologie*, vol. xx., part 2.

318. GERBER (Königsberg). On the diagnosis of scleroma, with report of a new case from East Prussia. *Arch. f. Laryngol.*, vol. xvi., part 1.

319. DORENDORF (Strassburg). On leprosy of the upper respiratory passages. *Arch. f. Laryngol.*, vol. xvi., part 1.

320. GOERKE (Breslau). Degenerative changes in the pavement epithelium of the mucous membrane of the upper respiratory passages. *Arch. f. Laryngol.*, vol. xv., part 3.

321. MANCIOLI (Rome). Dental caries and nasal obstruction. *Arch. internat. d'otol.*, etc., vol. xviii., 1904, p. 141.

317. After an examination of one hundred women during gestation, the puerperium, and lactation, the author concludes that there is a distinct physiological relationship between the female sexual organs and the nose. In 66 per cent. of those examined there were hyperæmia and hypertrophy of the turbinals, especially of the lower, during pregnancy. The changes in the nose during pregnancy were not periodic but continuous (nose-bleeding in 25 per cent.), and only during pregnancy a decided increase in volume of the turbinals takes place, which elicits reflexes on the part of the respiratory organs. In predisposed persons the contiguity of a hypertrophic turbinal and the septum may produce a reflex which simulates the picture of hyperemesis gravidarum. The nasal changes often persisted after puerperium. In the pharynx a hypertrophy or hyperæmia does not so

frequently occur, but usually in the tonsils. The entire changes of appearance in the nose are due to the blood and the circulatory apparatus.

SUCKSTORFF.

318. Report of a new case. In the nose and naso-pharynx the characteristic changes, as well as in the larynx. Though the microscopic examination was negative, a diagnosis of scleroma was made. The Mikulicz cells and the bacteria are usually to be found only in fresh infiltrations, rarely in old sclerosing tissue and in the scars as in the present case.

ALBANUS.

319. After general remarks on leprosy in the Canary Islands, the investigations on the upper respiratory passages in 35 lepers are given. The observation that lepra bacilli are scattered about during speaking, coughing, and sneezing, and the hypothesis of a nasal primary affection of leprosy, cause increased interest in the leprosy diseases of the upper respiratory passages. In 35 patients, there were changes in the interior of the nose in 33. In 4 there was a previous history of nose-bleed, frequently leprosy infiltrations of the mucous membrane. In 20 of the 35 there was a perforation of the septum, ulcer of the septum in 4. Contraction and the formation of scars and marked deformity of the entire skull resulted. The turbinates were often destroyed. The sense of smell was intact. The exterior of the nose was deformed, partly by destruction of the interior of the nose, partly by infiltrations and the formation of nodules of the external nose. The usual types are: the depressed nose, the flat nose of the negro, a thinning of the tip of the nose. The nodules in the external skin of the nose were absorbed or ulcerated. Leprosy of the nose occurs frequently in the tuberous variety, rarely in the anæsthetic variety. The pharyngeal cavity was diseased in 18 cases, especially in the form of an infiltration in the neighborhood of the raphe of the palate, also in the palatal arches, the uvula, the tonsils, and the posterior pharyngeal wall. In 5 cases there were changes of the tongue (nodules, papillomatous hypertrophy, cicatricial white spots). These observations seem to prove that the mucous membrane of the upper respiratory passages, especially of the nose, serves as an extremely frequent path of infection.

ALBANUS.

320. In seven cases (round-celled sarcoma, pigment sarcoma, endothelioma of the nose, pendulous tonsil of the pharyngeal tonsil, two tuberculous tumors of the larynx, one aural polyp).

peculiar degenerative processes of various grades were observed in the surface epithelium, which led to the formation of cavities, intracellular as well as intercellular, of a homogeneous globular formation, as well as the development of an intra-epithelial reticulum. The conclusions are as follows: The cavities in the pavement epithelium of the mucous membrane are formed by the collection of lymph fluid between the cells of the Malpighian layer. In other cases the formation of cavities depends upon a degeneration of prickle cells. This degeneration may consist of a fluidification of the central plasma and lead to the well-known picture of reticular degeneration (Unna). More rarely a peculiar transformation of the protoplasm into homogeneous globules takes place which are to be regarded as colloid. All three presumably may occur in some specimens. The cause for this change of the epithelial cells is furnished by the lymph fluid which passes through the epithelium, an inflammatory process underneath the epithelium.

ALBANUS.

321. The most frequent and important cause of caries of the teeth, according to the author, is obstructed nasal respiration, because thereby the introduction of bacteria into the mouth is favored. As frequently during an acute coryza pain in the teeth starts, the author believes that even after mouth-breathing for a very short time dental caries may follow.

OPPIKOFER.

b.—SYMPTOMATOLOGY.

322. KILLIAN (Worms). On subjective cacosmia. *Münchener med. Wochenschr.*, 1904, No. 39.

323. The cause of the cacosmia in the two cases reported was found in concretions situated in unusually deep Rosenmüller's fossæ. The fetor was especially pronounced on blowing the nose. Diagnosis cannot be made with the mirror but by cleansing with the cotton probe.

SCHEIBE.

c.—OZÆNA.

324. GUARNACCIA (Catane). Gersuny's method in atrophic rhinitis. *Arch. internat. d'otol.*, etc., 1904, vol. xviii., p. 210.

325. BARATOUX. The treatment of atrophic rhinitis by interstitial injections of paraffin. *Le progrès médical*, 1904, No. 27.

326. OPPIKOFER (Bâle). The treatment of ozæna with collargol. *Arch. internat. d'otol.*, etc., vol. xviii., p. 538.

323. Based on sixteen cases, the author recommends injections of paraffin in ozæna which is not too far advanced. In four cases healing occurred; in eleven, improvement with diminution of the fetor and slight formation of scabs, so that a nasal douche was necessary only every other day. In one case the injections were without avail. In two cases there was slight œdema of the orbital tissues, which disappeared on the second day.

OPPIKOFEK.

324. The author uses paraffin melting at 50° C. An ordinary glass syringe is used with a needle 8-10 cm long. The author warns against injecting more than 1 cc of paraffin at one time.

OPPIKOFEK.

325. After the suggestion of Roques and Oppikofer, the author has used collargol in twenty patients suffering from ozæna without succeeding in curing a single case. The improvement is explained by the use of the nasal douche, not from the collargol.

OPPIKOFEK.

d.—NASAL SEPTUM.

326. WEIL (Vienna). On the submucous resection of the nasal septum. *Arch. f. Laryngol.*, vol. xv., part 3.

327. FREER (Chicago). On the preceding article of Dr. Weil on the submucous resection of the nasal septum. *Ibid.*, vol. xvi., part 1.

328. HAJEK (Vienna). Remarks on some papers on the window resection of the deviated septum. *Ibid.*, vol. xvi., part 1.

326. The author has practised submucous resection of the septum for ten years. He has never used sutures, and in the first case has followed the suggestions of Trendelenburg, who warns against injury of the anterior margin of the septum. It is not unimportant if starting from the free margin the lower part of the quadrangular cartilage is sacrificed, because the small strip of cartilage along the dorsum of the nose may fracture from a slight traumatism. The author has constructed two knives in order to remove the entire cartilaginous septum in toto. The convex side is packed with iodoform gauze.

ALBANUS.

327. The author claims that he had suggested the construction of knives suitable to remove the entire cartilaginous part of the septum before Weil.

ALBANUS.

328. HAJEK replies to Mueller that according to his experience the preservation of the mucous membrane on the convex side is an improvement of the method. He did not wish to.

state that the idea of the preservation of the mucous membrane on the convex side originated either with Menzel or with him. In regard to the window resection, it is principally only a modification of Hartmann-Petersen's method of operation.

ALBANUS.

c.—TUMORS.

329. RICHARDS. A pedunculated bony tumor of the nasal septum. *The Laryngoscope*, Aug., 1904.

330. RÖPKE (Solingen). An endothelioma of the nasal cavities. *Münchener med. Wochenschr.*, 1904, No. 33.

331. DONOGÁNY and VON LÉNÁRT (Budapest). On a primary carcinoma of the nasal cavities. *Arch. f. Laryngol.*, vol. xv., part 3.

329. In a woman, aged thirty-two, with a specific history, a small raspberry-like tumor was situated upon the posterior portion of the right septum, high up, and almost at the posterior margin of the vomer. It was $1\frac{1}{4}$ " long, pear-shaped, contained areolar tissue with many venous sinuses within, and a few racemose glands, beneath which there was a rim of bone, like a cyst of the middle turbinate, except that it had solid contents.

M. TOEPLITZ.

330. This case is one of a woman twenty-three years of age, which developed after an injury and terminated with meningitis. The tumor probably originated from the pterygoid process, was bilateral, and had led to a tumor of the angle of the lower jaw and the upper jaw.

SCHEIBE.

331. Seven cases are reported of these ear conditions. Literature is quoted and the statistics of frequency are given. In regard to the interesting question of the transformation of a nasal polyp into a carcinoma, the author brings the following observations of a case in which in an extended carcinoma there was a tumor with the appearance of a mucous polyp, the lower two-thirds of which on examination proved to be carcinomatous, the upper half œdematous connective tissue. The early symptoms in these cases were nasal occlusion, then nose-bleed, frequently profuse in character. Pain was absent in some cases; rarely very severe darting pain was experienced. The tumor was not in all cases adherent to the surrounding tissues. In four cases the origin seemed to be the region of the middle meatus and the middle turbinal, in two cases parts of the lower turbinal; in one case the site of the origin could not be determined. According to

literature, the most frequent origin is the middle turbinal. In the subsequent course severe headache, constant nasal occlusion, deformity of the nose, perforation of the tumor into the face, usually through the orbital angle, extension to the orbit and occlusion of the tubes, earache, pharyngeal symptoms, putrid discharge, loss of appetite and of strength. Death from cachexia or from meningitis, brain abscess. Metastases could not be determined clinically. Histologically six of the seven carcinomas were basal-cellular in the sense of Krompecher. Discussion of differential diagnosis. Sarcoma occurs before the fortieth year, carcinoma generally after. Cancer has a great tendency to ulceration. The tendency to hemorrhage was pronounced in only half the cases. Microscopic examination is always necessary because in one case the tumor, on account of its limitations and clinical symptoms, could have been macroscopically mistaken for a fibroma or a fibro-sarcoma. Prognosis is bad whether operated upon or not. Four cases were operated upon, three died from relapses, four cases have not been observed sufficiently long.

ALBANUS.

f.—ACCESSORY CAVITIES.

332. GUIZEZ (Paris). A case of ethmoidal mucocoele. *Annales des maladies de l'oreille*, etc., 1904, Feb.

333. LERMOYEZ (Paris). Spontaneous recovery of a true empyema of the maxillary antrum. *Ibid.*, 1904, Jan.

334. CLAOUÉ (Bordeaux). The treatment of chronic empyema of the maxillary sinus by a broad resection of the nasal wall. *Ibid.*, 1904, Jan.

335. RÉTHI (Vienna). The radical operation for empyema of the maxillary sinus from the nose. *Wiener klin. Wochenschr.*, No. 34, 1904.

336. ESCAT (Toulouse). Empyema of the ethmoidal and sphenoidal sinuses in a child of twelve years. *Arch. internat. d'otol.*, etc., 1904, vol. xviii., p. 124.

337. BURCHARDT (Bonn). A modification of Kuhnt's operation in chronic empyema of the frontal sinus. *Arch. f. Laryngol.*, vol. xv., part 3.

338. CLAUS (Berlin). The radical operation for chronic maxillary sinusitis. *Ibid.*, vol. xvi., part 1.

339. BINDER (Graz). On the extraction of a foreign body from the maxillary antrum under guidance of the salpingoscope. *Ibid.*, vol. xvi., part 1.

340. CANFIELD. The application of conservative and radical surgery to chronic nasal accessory-sinus disease. *Med. News*, July 16, 1904.

341. KELLY. Inspection of the antrum of Highmore. *Lancet*, Sept. 17, 1904.

342. SIEBENMANN (Basel). The dislocation posteriorly of the nose in the bilateral operation for frontal-sinus empyema. *Arch. f. Laryngol.*, vol. xv., part 3.

343. HAJEK (Vienna). On the diagnosis and intranasal surgical treatment of suppurations of the sphenoidal cavities and of the ethmoidal labyrinth. *Ibid.*, vol. xvi., part 1.

344. DOR. Sphenoidal and maxillary sinusitis following a specific lesion of the base of the skull, with ocular complications. *Lyon médical*, 1904, No. 29, p. 113.

332. In the left nasal cavity a mucocoele had gradually developed between the two orbits, consisting of a completely closed osseous cavity containing mucus and cholesterin crystals. Resection of the anterior wall with recovery. Of interest is first the size: the tumor had dislodged the left eyeball to the left and the septum to the right, and had pushed forward the dorsum of the nose. The cavity was as large as an orbit. Second, the etiology: The tumor developed after a traumatism of the region of the forehead. The author questions the connection. The reviewer, however, saw a mucocoele of the frontal sinus develop in two weeks after a blow on the forehead. In both cases there was hemorrhage from the other side of the nose. Is it possible that the naso-frontal duct became occluded by a fracture of the floor of the frontal sinus?

BOENNINGHAUS.

333. LERMOYEZ advises in suppurations from the maxillary antrum of dental origin to await future extractions of the teeth before deciding upon other operative measures. He has observed two cases in which the extraction of teeth resulted in recovery.

BOENNINGHAUS.

334. After resecting the anterior two-thirds of the lower turbinal, the author perforates the nasal wall of the maxillary antrum in the lower meatus with a hand trephine, enlarges the opening with a forceps, cures the cavity and fills it with gauze from the nose. This is all done under local anæsthesia. In twelve cases nine recovered. It is in general the same method which Réthi recommends.

BOENNINGHAUS.

335. To the previously published series of 5 and 6 cases an additional series of 4 new cases is added, of which 3 were cured and one improved, so that altogether there are 12 recoveries in 15 cases during an interval of one and a half to four months. The severest cases are operated upon according to this method.

After making the opening the author immediately proceeds to use the sharp spoon. Narcosis is never necessary. After operation daily irrigations, which are later made only after two, three, and four days.

WANNER.

336. A boy, twelve years of age, was taken ill with an acute suppuration of the accessory cavities which led after one week to an abscess of the inner side of the left orbit and to blindness. An examination of the eye-grounds made in the fifth week showed left-sided atrophy of the optic nerve. In the seventh week of the disease the boy was brought to ESCAT, who opened the ethmoid cells and the sphenoid from the orbit and removed the puriform mucous membrane. Recovery.

OPPIKOFEK.

337. Owing to the well-known disadvantages of Kuhnt's method in extensive frontal sinuses, especially with a deep antero-posterior diameter, with prolonged treatment with irrigations and painful packings which finally result in fistulæ and deformed scars, the author removes the bone and anterior wall just as Kuhnt suggests and inserts a thick drainage tube into the dilated naso-frontal duct and closes the operative wound. As soon as the incision is healed with firm packing, the skin and periosteum of the anterior wall are then pressed against the posterior wall of the cavity in order to facilitate healing. From the periosteum and connective tissue, bands are formed which correct the depression which is at first noticeable. As opposed to Kuhnt's method of operation, which is longer and removes the protection which the orbital roof affords to the eye and connects the frontal sinus with the orbit, the author is in favor of a simpler method which has given him satisfactory results in eighteen cases. The cosmetic result was good in those cases which were operated primarily according to this method. Two complete case-histories are added.

ALBANUS.

338. The author makes a small opening in the anterior wall of the upper jaw and resects the anterior wall with Hajek's or his own bone forceps. The cavity is then freed of granulations and packed. When the discharge becomes less, tampons of protargol are introduced.

ALBANUS.

339. In a case where the maxillary antrum was operated upon on account of empyema, a gauze plug was lost in the cavity through the narrow drainage channel and kept up a continuous fetid suppuration. The canal was enlarged to $6\frac{1}{2}$ mm, and after

introducing the salpingoscope it was possible to observe the foreign body in the alveolar depression and to extract it.

ALBANUS.

340. CANFIELD bases his observations upon 200 cases of chronic disease of the different nasal accessory sinuses treated radically, and upon 110 cases treated conservatively by other operators. One-half of all chronic empyemas are simple, not combined. Complete relief can be had mostly by conservative treatment in 50 % of all chronic cases, and in 90 % of uncombined cases. The best results from thorough conservative surgery must be expected from intranasal methods, not only through that of the sinuses, but of the entire nose and nasopharynx. To establish free nasal respiration, deviations, hypertrophies, and adenoids have to be removed. Canfield enters the antrum through the inferior meatus. The cases which do not clear up are generally combined with the ethmoid. In extensive ethmoid cases the sphenoid must be examined, and if found diseased, the anterior inferior wall is removed. After all these conservative means have been exhausted, radical measures are resorted to: for the antrum, Jansen's method somewhat modified by Canfield; for the frontal sinus, Killian's, both of which are minutely described.

M. TOEPLITZ.

341. BROWN KELLY opens the antrum with a trocar, under cocaine, in the canine fossa, and introduces a speculum through the hole when the bleeding has ceased; the condition of the lining membrane can then be directly observed, and pathological conditions treated.

ARTHUR CHEATLE.

342. The bilateral operation of KILLIAN for frontal sinuses which are unusually deep in an antero-posterior direction has given the author poor cosmetic results, because the soft parts sink in above the remaining bony ridge. In two cases an excellent result was obtained. After entire or partial removal of this orbital ridge, the roof of the nose was mobilized and pushed directly backward, by removing a wedge from the bony nasal septum down to the palatal plate. The roof of the nose could then be pushed back and retained in place by a dressing.

ALBANUS.

343. This paper supplements the corresponding chapter in the author's text-book, and first treats of the diagnosis of suppurations of the accessory sinuses classed as belonging to the

second series. It is necessary first to exclude suppurations in the olfactory fissure (causes: acute coryzas, carious bone, foreign bodies). The diagnostic complications in broad olfactory fissures and in visible sphenoidal ostium are then given.

1. Empyema of the sphenoidal cavity.
2. Combination of empyema of the sphenoidal cavity and of the posterior ethmoidal labyrinth.
3. Pyosinus of the sphenoidal cavity.
4. Empyema of the posterior ethmoidal labyrinth.

These four possibilities are described with illustrative case-histories. The anatomical features are given concerning the relationship of the sphenoidal cavity to the olfactory fissure and to the ethmoidal labyrinth, with illustrations, which show that the proportion of the anterior wall of the sphenoidal cavity which is in relation to the olfactory fissure, to that which is covered by the ethmoid labyrinth, can be expressed in the proportion of three to five. Therefore, in order to resect the entire anterior wall of the sphenoidal cavity, the medial wall of the posterior or sphenoidal-ethmoidal cells must first be removed. The wall of the sphenoidal cavity can be resected by enlarging the sphenoidal ostium with the modified hook, which is much stronger than the early model. Then introduction and employment of two bone forceps (illustrations), one with descending and the other with ascending branches, to remove the lower and the upper parts of the anterior wall of the sphenoidal cavity. In the future treatment, care must be taken to prevent the covering of the edges of the wounds of the new-formed and sphenoidal cavity by sequestrations. A number of illustrative cases are given with good pictures. Finally, one case is reported in which it is possible to demonstrate an ethmoidal cell situated above the sphenoidal cavity, where a suppuration was discovered in the sphenoidal cavity and a closed empyema of the posterior ethmoidal labyrinth.

ALBANUS.

344. Three cases of optic neuritis, caused by a suppuration of the sphenoidal cavity. It seems to us, however, questionable whether, in these cases, the neuritis really depended upon the sphenoidal affection. In Case 1 there is no history, and there is only the statement that in an old man a one-sided optic-nerve atrophy was found. Based on the previous history, a sphenoidal empyema was taken for granted. In the second case, details are also absent. It is only stated that an operative treatment of

sphenoidal empyema was suggested. The patient did not consent, and, contrary to expectation, complete recovery took place. In Case 3, the diagnosis of empyema of the sphenoidal and maxillary sinuses was made. Without treatment of the sphenoidal cavity, and after opening of the maxillary sinus, the optic neuritis diminished and the suppuration ceased. As a previously existing hemianopia disappeared on antisyphilitic treatment, it seems probable that the optic neuritis was also of syphilitic origin, and that there had been no sphenoidal empyema.

OPPIKOFEK.

g.—OTHER DISEASES OF THE NOSE.

345. JOSEPH (Berlin). Diminution in size of the nose. *Deutsche med. Wochenschr.*, No. 30, 1904.

346. ROE. The removal of obstructions and cicatricial contractions of the nose by the plastic method. *N. Y. Med. Jour. and Phila. Med. Jour.*, July 30, 1904.

347. MOUNIER (Paris). Results of systematic applications of penghawar in hemorrhages of the mucous membrane of the skin. *Arch. internat. d'otol.*, etc., vol. xviii., p. 526.

348. RHODES. Nasal hydrops. *Ann. Otol., Rhin., and Laryngol.*, June, 1904.

349. STÖCKEL (Berlin). On nasal reflexes. *Wiener klinisch-therapeutische Wochenschr.*, No. 30, 1904.

350. DE SIMONI (Mailand). A case of bone mycosis of the nasal cavity. *Wiener med. Wochenschr.*, No. 37, 1904.

351. MELZI (Milan). Primary tuberculous ulcerations of the inferior turbinal. *Arch. internat. d'otol.*, etc., vol. xviii., p. 109.

345. In a large number of patients who suffered from a deformity of the external or internal nose, and were consequently hindered in the pursuit of their professions, relief was obtained partly by a cutaneous incision and partly by a subcutaneous operation with suited instruments whereby the prominence was removed, as can be seen from the accompanying illustrations, and the normal form of the nose obtained without causing deformity from the incisions. Though this method may be suited in cases of protuberances, it is hardly to be recommended for the correction of noses which are too broad. As the frontal process of the superior maxilla is resected, and then by pressure on the lateral parts of the nose pressed toward the middle, in which position it is retained until the displaced bony fragment becomes firmly attached through the formation of callus, the purpose of narrowing the upper parts of the nose may thus unquestionably be

obtained, but at the same time the interior of the nose probably suffers an unwelcome diminution of its lumen. **NOLTENIUS.**

346. In the removal of obstructions, congenital narrowing, cicatricial contraction of the nasal entrance, and of occlusions of the nasal passages, wounding of opposite surfaces is to be avoided. ROE covers the denuded surface on one side with skin, mucous membrane, or healed tissue taken from the surface of the contraction or band, and explains this plastic method by several illustrations. After the removal of redundant tissue, the flaps are stitched by fine horsehair sutures, inserted into special small curved needles with a double spiral curve. This method is also used in the submucous resection of the septum and in cases of bony or cartilaginous spurs. In collapsed *alæ* ROE incises the shield cartilage from the inside through the skin at the point of its greatest depression, removes a small wedge-shaped portion in the cartilage with the base of the wedge towards the interior of the nose, and then stitches the edges together with horsehair sutures. **M. TOEPLITZ.**

347. According to MOUNIER, penghawar, which was originally recommended by Michelson, is an excellent hæmostatic. It is to be applied not only in actual cases of epistaxis but in endonasal operations. The agent has this advantage over the introduction of gauze, that the nose is not occluded, and that the threads separate spontaneously after a few days. The felt-like mass contains tannin; nevertheless its hæmostatic action is probably wholly mechanical. The activity of the agent is not destroyed by sterilization, so that it can be applied directly without danger to the bleeding areas. **OPPIKOFER.**

348. RHODES relates the case of a woman, aged forty-four, with constant dripping of fluid from the right naris, which had continued for six weeks day and night. She had a similar attack before this, lasting ten days. She was of a decidedly nervous temperament, had been under considerable physical and nervous pressure previous to the attack, which came on suddenly on a very cold day with severe aching, burning, and stinging sensation in the right side of the nose, accompanied with sneezing and the symptoms of an acute rhinitis. In three days the watery discharge began. The discharge dripped on an average of about four large drops a minute, when the head was held forward. The nights were much disturbed. The nasal cavities were free and normal. The fluid was clear and limpid, spec.

gravity 1.012, alkaline. It was a serous exudate; twelve ounces were discharged in twenty-four hours. After the local use of twelve per cent. argent. nitric. (sixty grains to the ounce), the dripping ceased. Rhodes explains the case, first by a marked irritation of the terminal fibres of the vasomotor nerves in the nasal mucosa, followed by paresis and an exosmosis of fluid through loss of nervous control. The character of the fluid differentiates it from cerebro-spinal rhinorrhœa; headache was not present. A complete bibliography is appended.

M. TOEPLITZ.

349. A collection of the latest views on this subject in the form of a paper for general physicians. WANNER.

350. A patient, twenty-nine years of age, had suffered for several months from a purulent discharge from the nose and the sensation of increasing nasal occlusion; a small slightly painful tumor appeared on the hard palate, which discharged blood and a little pus. Then reddening and swelling of the right cheek in the neighborhood of the nose set in. Complete occlusion of the nasal cavities; discharge of fetid pus mixed with blood.

The nose is filled with a red fleshy, slightly bloody tumor attached to the septum, to the middle and lower turbinals, and to the floor of the nose. In the middle of the palate there is an ulcer 1 cm broad. The probe passes from the palate into the nose. On microscopic examination actinomycosis is found. The differential diagnosis between the syphilitic tuberculous process and rhino-scleroma is given.

After using the curette, and the administration of iodide of potash, permanent healing took place. WANNER.

351. A girl, twenty years of age, presented a tuberculous ulcer in the middle third of the left lower turbinal. This induced the author to collect the cases of nasal tuberculosis described in literature. In 90 cases tuberculosis was primary in 19, in 5 the ulcerating form, in 14 the tuberculous. In the 5 cases of primary tuberculous ulcer, the ulcer was situated in 4 cases in the area of the mucous membrane covering the cartilaginous septum, in only 1 together with a lesion on the floor of the nose and the lower turbinal. OPPIKOFER.

h.—NASO-PHARYNX.

352. GOERKE (Breslau). On the pathology of the pharyngeal tonsil. IV. The involution of the pharyngeal tonsil. *Arch. f. Laryngol.*, vol. xvi., part 1.

353. FISCHER (Copenhagen). The symptoms, course, and complications of adenoid vegetations. *A. f. O.*, vol. lxii., p. 188.

354. JARECKY. Adenoids in infants. *N. Y. Med. Jour. and Phil. Med. Jour.*, Aug. 13, 1904.

355. BURGER (Amsterdam). Fatal hemorrhage after removal of the adenoids. *Presse oto-laryngologique Belge*, No. 4, 1904.

352. The author has studied the involution of the pharyngeal tonsils on specimens obtained from cadavers, as well as from children and adults at operation. The follicular tissue was found to have disappeared and to be replaced by an indifferent tissue. The connective tissue does not increase. The ciliated cylindrical epithelium is replaced by a more resisting pavement epithelium. The pharyngeal tonsil involutes as soon as its function becomes unnecessary. This is not an immunizing process nor normally accompanied with morbid symptoms. It is only the expression of an immunity acquired in another way, especially against infectious diseases peculiar to childhood. After the involution of the pharyngeal tonsil has taken place, the histological picture of the normal pharyngeal mucous membrane is present. The involution is checked or retarded by involuntary processes which can be recognized by the microscopic picture of the not completely involuted tonsil. The involution cannot be produced in a conservative fashion in adults. Hence the necessity of operation.

ALBANUS.

353. This is a very complete study of the above subject, including the frequency of the various symptoms and complications, based on observations of five hundred cases.

HAENEL.

354. JARECKY reports four cases of adenoids in babies of from eight to ten weeks old, and a fifth in a syphilitic child eight days old. He operates on babies with a special curette, the cutting surface being $6\frac{1}{2} : 5\frac{1}{2}mm$ with a depth of $2mm$, set at an angle of 120° to the shaft, about $10mm$ above the bend. The shaft is slightly pliable and has a handle $20cm$ long.

M. TOEPLITZ.

355. The tonsils were removed with a tonsillotome, and the pharyngeal tonsil with Kirstein's knife in a boy eleven years of age. Half an hour after discharge severe hemorrhage occurred from the naso-pharynx, which continued notwithstanding firm packing for six hours and caused the death of the child. Autopsy showed it to be a case of leukæmia.

BRUEHL.

PHARYNX AND MOUTH.

356. WASSERMANN. A congenital pharyngo-palatal diaphragm. *Arch. f. Laryngol.*, vol. xv., part 3.
357. CHAUVEAU (Paris). Absence of the right anterior pillar and of the right tonsil. *Arch. internat. d'otol.*, etc., vol. xviii., p. 232.
358. FONK (Chile). Clinical contributions on the disappearance of the motor innervations of the uvula. *Arch. f. Laryngol.*, vol. xvi., part 1.
359. SCHIFFERS (Lüttich). A retro-pharyngeal abscess and diphtheria. *Arch. internat. d'otol.*, etc., vol. xviii., p. 433.
360. UFFENHEIMER (München). On the symptoms and bacteriology of membranous angina (usually called Vincent's or Plant's angina). *Münchener med. Wochenschr.*, 1904, Nos. 27, 28.
361. STONE. A new pathogenic throat organism. *Med. Record*, Aug. 13, 1904.
362. LJUBIMOW. On the action of salicylate of soda on the course of anginas. *Wojenno-meditsinski Shurnal*, 1904, No. 5.
363. ZIEGNER (Halle). On the surgical treatment of tonsillar abscesses. *Münchener med. Wochenschr.*, 1904, No. 19.
364. NEWCOMB. Bone and cartilage in the tonsil. *Med. News*, Sept. 24, 1904.
365. COMPAIRE (Madrid). A calculus of the left palatal tonsil. *Arch. internat. d'otol.*, etc., 1904, vol. xviii., p. 155.
366. WRIGHT. Actinomycosis of the tonsils. *Amer. Jour. Med. Science*, July, 1904.
367. HENRICI. Amputation of hypertrophic palatal tonsils with a cold snare. *Münchener med. Wochenschr.*, 1904, No. 14.
368. MIODOWSKI (Breslau). On the histology of tonsil appendages. *Arch. f. Laryngol.*, vol. xv., part 3.
369. BAUROWICZ. On the diagnosis of gummatous tumor of the palatal tonsils. *Arch. f. Laryngol.*, vol. xvi., part 1.
370. SREBRNY (Warsaw). Thrush in healthy adults. *Arch. f. Laryngol.*, vol. xvi., part 1.
371. ACHWLEDIANI. A new case of recovery from noma by pyoktanin. *Medicinskoje Obozrenje*, 1904, No. 17.
372. CHAPPELL. Four unusual tumors in the naso-pharynx. *The Laryngoscope*, Aug., 1904.
373. CRANDALL. A case of Vincent's angina and stomatitis. *Jour. Amer. Med. Assoc.*, July 23, 1904.

356. A woman, seventy-one years of age, with pulmonary phthisis (there were no signs of acquired or congenital syphilis); two bands were observed to travel behind the posterior palatal arch, from the upper free border of the soft palate, in direct continuity on the right and left sides of the uvula, direct to the posterior pharyngeal wall. This deformity presented an opening of about 1 cm broad. The naso-pharynx normal. ALBANUS.

357. The author observed accidentally in a man, thirty-five

years of age, the absence of the right anterior palatal arch and of the right tonsil. No disturbance. OPPIKOFER.

358. After the report of 142 cases of abnormal positions of the uvula, statistics of the very manifold etiology are given. The condition occurred 41 times in affections of the soft palate and of the pharynx, lymphomata of the neck, otitis, dry nasal catarrh, struma, laryngitis, pulmonary tuberculosis 19, variola, syphilis 6 times, influenza, measles, and scarlet-fever. In diseases of the nervous system, especially diphtheria, paralysis of the facial nerve, deformity of the skull, supraorbital neuralgia, spinal irritation, neurasthenia. General diseases: anæmia, chlorosis, rickets, general weakness, and alcoholism. Most frequently observed in youthful age, occasionally congenital. In some cases the condition seems to have a local cause (direct injury to the nerves and muscles of this part), though it generally depends upon distant disturbances of innervation. A cause for the nervous disturbances is also to be found in anæmia, chlorosis, weakness, rickets, and neurasthenia. ALBANUS.

359. In a boy, four years of age, following tonsillar diphtheria, a retropharyngeal abscess occurred. Incision. The pus contained diphtheria bacilli. Recovery. OPPIKOFER.

360. Five cases of Vincent's angina, which were all one-sided and of mild course. Bacteriological examination revealed the fusiform bacillus and spirochete, which, notwithstanding much endeavor, could not be cultivated in pure culture. The fusiform bacillus only grew in sterile human saliva. Transmission to animals and human beings was without result. SCHEIBE.

361. In an epidemic, during the winter of 1903-1904, STONE saw eighty-one cases of acute inflammation of the throat, accompanied by severe toxæmia, lasting from twenty-four to forty-eight hours, ushered in with chilliness, pain in head and limbs, and much sneezing. The tonsils were swollen and often covered with a false membrane. In all cases appeared a peculiar diplococcus in the throat, with its adjacent sides flattened. They readily stain by the Loeffler, fuchsin, and the Gram method. On agar, round regular colonies grow; on blood serum and potato there is also luxuriant growth. Animal inoculations show the organism pathogenic for laboratory animals. M. TOEPLITZ.

362. In sixty-four cases, salicylate of soda exerted a beneficial action on the course of this disease. SACHER.

363. Especially in cases with ankylosis of the jaw, a lancet bent to an angle like a paracentesis needle is recommended.

SCHEIBE.

364. NEWCOMB removed, in a woman, aged thirty, the right tonsil without incident; a few days later, the tonsillotome drove through the left tonsil, striking a hard substance. A small, rounded tip of bone was found in the removed tonsil. It belonged to the styloid process, the remainder of which could be easily made out by palpation. Newcomb discusses the publications on this subject, and also those on bony and cartilaginous deposits scattered through the tonsils. A bibliography is appended.

M. TOEPLITZ.

365. A woman, forty-three years of age, suffered since childhood from frequently recurring angina. Difficulty in smelling and the sensation of a foreign body lasted for six weeks. Nasal voice, disagreeable breath from the mouth. The left tonsil appears like a tumor, so that at first the diagnosis of sarcoma was made. The extracted tonsil calculus was as large as a chestnut, of gray color, and uneven surface. After removal of the calculus a tablespoonful of pus was discharged from the depths of the tonsil. Recovery.

OPPIKOFER.

366. WRIGHT reports the case of a boy, aged twelve years, who, after the removal of his tonsils, remained well, no metastasis having shown itself. In the sectioned tonsil one cavity was found. The minute, well-illustrated microscopical description shows an abscess cavity occupying a large area. In the cavity are seen the peculiar striated kernels, the striations being more marked at the edges. Under higher power there appear the edge of one of the striated clumps (Drusen) and the peculiar branching, club-shaped rays of the actinomyces group, and through the blur and granulations of the interior of the clump the characteristic lace network. The ends of the actinomyces are pointed directly into the epithelium, the cells of which are also fragmented. The reticulum of the lymph cells is succumbing to the "granulation" process. The infecting germ is located in a tonsillar crypt. It excretes a toxin, which causes proliferation and disintegration of the epithelium. The cavity of the crypt is thus painlessly enlarged. The remaining, greater, part of the paper is occupied with an historical consideration of the actinomyces, its relationship to the tubercle bacillus, its port of

invasion (most frequent in mouth and pharynx), and the protective influences, which prevent the annihilation of the race.

M. TOEPLITZ.

367. HENRICI recommends the cold snare to remove tonsillar hypertrophies. The tube in Krause's snare must be unusually strong; the ends of the wire must be firmly fixed. SCHEIBE.

368. 1. In a girl, eleven years of age, there was a tumor, 12mm long, 4mm broad, the shape of an egg, covered with firm, grayish-red mucous membrane at the site of the left tonsil. It proved to be histologically an angio-fibroma. 2. A man, forty-one years of age, presented on his right tonsil an appendage as large as a pea, with a short root, which upon examination proved to be a plug of exudate in process of organization. 3. A boy, six years of age, showed an ovoid pedunculated tumor, 1½ by ½cm, in place of the right tonsil. 4. A boy, ten years of age, had an appendage as large as a pea attached to the right tonsil. Both proved to be true ad-tonsils. 5. In a girl, eight years of age, a globular tumor, as large as a walnut, hung down from its attachment to the lymphoid tissue of the tubal ostium. Its greatest diameter measured 3cm; its weight was 12g. On examination it was a hypoplastic ad-tonsil. The pharyngeal tonsil was also hypoplastic. ALBANUS.

369. The author has observed a man, forty-five years of age, who complained of occlusion of the right nose and coryza. In the naso-pharynx there was a smooth, elastic tumor, as large as a pigeon's egg, which had been observed for three months, and which occupied the region of the palatal tonsil and the left posterior palatal arch. The diagnosis of fibrolipoma was made. Three months later, the patient complained of tension in the neck, pain in the direction of the left ear. On examination, the cervical glands were not enlarged. The tumor was of the same size. In the direction of the tongue it was greenish-yellow in color. A probe passed through this covering into a large cavity, which contained a dirty-green putrid fluid. This was followed by relief. After the administration of iodid of potash for five days the picture was that of a broken-down gumma cavity, 2cm deep, with a yellowish exudate. ALBANUS.

370. The author saw this rare disease in adults in a young man, twenty-eight years of age, who was perfectly healthy, who in three days after an alcoholic debauch, when he had vomited, presented a deep-red mucous membrane in the mouth. The soft

palate, the tonsils, and the mucous membrane of the cheeks were covered with many small white spots. No fever. Recovery in two days. The second case was that of a rather anæmic woman, twenty-three years of age (in the sixth month of pregnancy, no vomiting), who had been repeatedly hoarse during the last three weeks, and had suffered from pain in the neck. In the left tonsil and the left palatal arch there was a whitish exudate, which disappeared after treatment with tincture of iodine. In both cases the diagnosis was formed by the microscope. The cases reported in literature are collected. ALBANUS.

371. This was a very severe case of noma in a child three years of age. A compress of 1 % pyoktanin solution was applied, the ulcerating process was arrested, and sequestration occurred.

SACHER.

372. In Case 1, a girl, aged fifteen years, the tumor completely filled the naso-pharynx, and was attached to the posterior end of the right inferior turbinate body. It was 2" long, 1½" wide, and ½" thick. It was an œdematous polyp. In Case 2, a young man, aged fifteen years, the tumor extended 1½" below the soft palate, chiefly on the left side, and was attached by pedicle, ½" long and ¼" thick, to the left tonsillar region, near the Eustachian tube. It measured 40:30:10mm after removal. It was an enormous exaggeration of the mulberry hypertrophies of the posterior extremities of the inferior turbinal, containing, as a unique feature, a number of lymph nodes. This lymphangiectasis was due to the enormous size of the growth, and the formation of the pedicle, which caused defective nutrition, or possibly congestion. Case 3 was a large adenoid growth, apparent below the free border of the soft palate. Case 4 was an unusually large pharyngeal tonsil, in a child two years of age. The microscopical examinations of all these cases were made by Dr. Jonathan Wright. M. TOEPLITZ.

373. A medical student, twenty-three years old, had at first pain in deglutition, the left tonsil being congested. On the second day, a small white spot was seen, which later on enlarged to ¼" in diameter, and was covered by a grayish-white pseudo-membrane, remaining six days. On the fourth day the gums were quickly and thoroughly inoculated, incident to cleaning the teeth by a dentist, and showed traces of the disease for six weeks. The fusiform bacillus and a spirillum, spirochæta dentium, were found in the smears. M. TOEPLITZ.

ARCHIVES OF OTOLOGY.

COMMUNICATIONS BETWEEN THE BLOOD-VESSELS IN THE MEMBRANOUS LABYRINTH AND THE ENDOSTEUM AND THOSE IN THE BONY CAP- SULE OF THE LABYRINTH.¹

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(With two text illustrations and two figures on Plates XIII. and XIV. of
Vol. L., German Edition.)

IF a section is made through the pyramid of the adult temporal bone, one can tell at a glance every point at which the labyrinth has been cut through by the dense ivory-like character of the bone which immediately surrounds its cavities. This ivory-like shell of the labyrinth constitutes its so-called bony capsule. There is no distinct line of demarcation separating the capsule of the labyrinth from the surrounding bone of the pyramid. The one passes imperceptibly into the other. In thickness the capsule measures from 2 to 4mm. A tube-like prolongation of the capsule encases the meatus acusticus internus.

In the foetus, the labyrinth with its bony capsule can be shelled out completely free from the surrounding temporal bone. In the earlier embryo, before ossification has taken place, the labyrinth with its cartilaginous capsule can be separated from the surrounding structures even more readily. If such a preparation of the labyrinth with its capsule be examined, it will be seen that the outlines of the cavities

¹ Read before the American Otological Society, May, 1905.

which make up the chambers of the labyrinth are but faintly indicated on the outer surface of the capsule. The cochlea appears as a cone-shaped mass with but slight if any markings on the outer surface indicating the several coils of the cochlea within. The covering of the vestibule presents a surface free from special markings except for the depression of the fenestra vestibuli. The outlines of the semicircular canals are but partially indicated by the markings on the outer surface. The space included between the three semicircular canals, forming a solid triangle with its apex pointing towards the vestibule and the base directed in the direction of the upper posterior border of the pyramid, is completely filled in with this capsule. In the adult bone this space is partially filled in with spongy bone, while the ivory-like bone of the capsule extends but a couple of millimetres around each semicircular canal.

A question of interest and one of considerable clinical importance in connection with the capsule of the labyrinth is the relation of its blood-supply to that of the membranous labyrinth and the endosteum. Are the two systems quite distinct, or are there communications between them? Do the blood-vessels of the capsule anastomose with those that supply the endosteum and the membranous labyrinth? This is a question which has interested the clinician as well as the anatomist. If it could be established that blood-vessel communications exist between the capsule and the membranous labyrinth, this might explain, for example, a possible route for an infection to spread from the *cavum tympani* to the structures of the labyrinth.

The study of otosclerosis has in recent years brought an additional interest to all questions relating to the anatomy of the capsule of the labyrinth.

That the blood-vessels which supply the capsule of the labyrinth communicate freely with those in the surrounding structures has long been recognized. The blood-supply of the mucosa lining the tympanum sends branches which penetrate the bony substance of the promontory; blood-vessels from the dura penetrate the area between the semicircular canals at the *fossa subarcuata*; the blood-vessels of

the temporal bone which surrounds the labyrinth communicate freely with those of the capsule.

The question whether the blood-vessels of the membranous labyrinth and endosteum communicate with those in the capsule was first taken up by Hyrtl, who expressed the opinion that the blood-vessels of the labyrinth form a closed system, which does not communicate with the vessels of the surrounding parts from the point where the artery penetrates the labyrinth in the bottom of the internal meatus to the place where the veins leave the labyrinth (see text Fig. I).

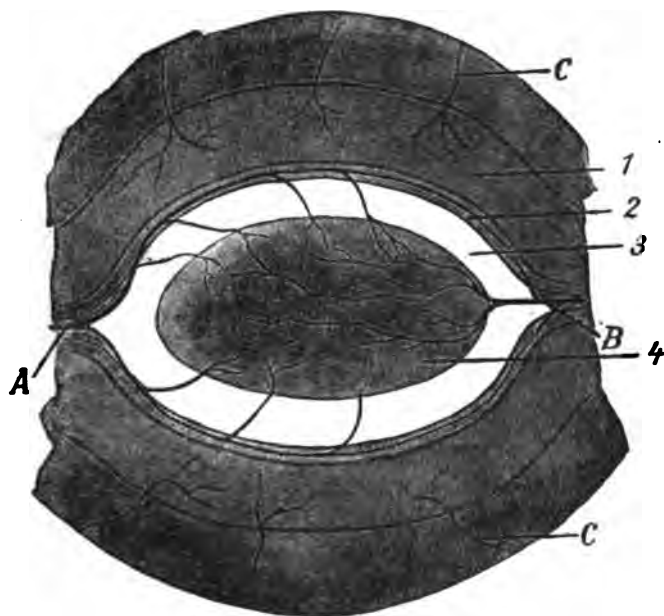


FIG. I.

Politzer, on the other hand, believed that he could demonstrate communications between the blood-vessels of the mucosa in the tympanum and the vessels in the membranous labyrinth (see text Fig. II). Between these two views opinion has been divided. The view of Politzer has been copied extensively in the clinical text-books on the ear. On the other hand, the opinion held by Hyrtl, that the blood-vessels of the labyrinth form a closed system, is the one

largely subscribed to by those who have made investigations on the subject.

The method chiefly used in working on this problem has been that of studying specially stained sections. Siebenmann,¹ in his work with metal corrosion, has made some interesting observations bearing on this subject. This method, however, does not permit of exact enough interpretation in regard to the blood-vessel connections between the capsule

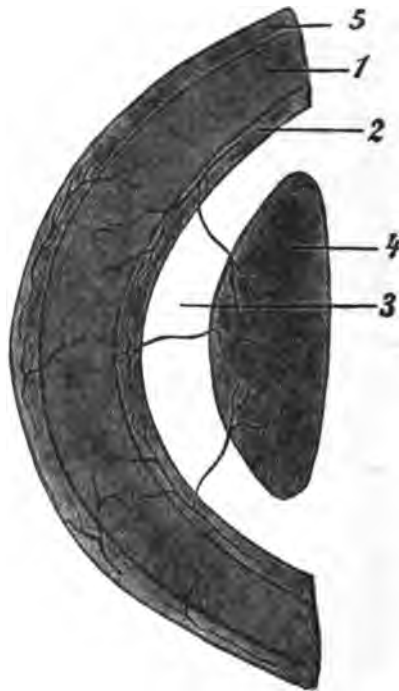


FIG. II.

and endosteum of the labyrinth to be of very definite value. The method of making celloidin casts of the labyrinth, which Eichler and Siebenmann used so successfully in studying the blood-vessels of the membranous labyrinth, and which I have used in studying the blood-supply of the labyrinth of the pig,² and that of the sheep and the calf,³ does

¹ *Die Korrosions Anatomie des menschlichen Ohres.*

² "Distributions of Blood-vessels in the Labyrinth of the Ear of *Sus Scrofa Domestica*." *Decennial Publications, University of Chicago.* University Press, Chicago, 1903.

³ *Zeitschrift für Ohrenheilk.*, Band xlviii., S. 381.

not lend itself to the study of this problem, because in this method the corrosion and subsequent removal of the capsule destroy just the vessels which we wish to study. In working with this method, however, I found that in making a celloidin cast of the labyrinth in which the capsule was still cartilage it was not necessary to remove the capsule at all, since the whole preparation, capsule as well, would clear up perfectly in creosote. It was also found that in cases where the labyrinth was prepared in this way, at the age when ossification was but partially advanced, the clearing up of the preparation, including the capsule, could still be satisfactorily accomplished in creosote, so as to permit of the study of the blood-vessels as they penetrated the region of beginning ossification. The problem was to get embryos at the age when the capsule was in the transition stage from cartilage to bone, where the process of ossification would be far enough along for the capsule to contain blood-vessels, and yet not so far advanced as to render it impossible to make the preparation sufficiently transparent in the clearing fluid.

The embryo of the calf was used because it was convenient to get this material at the proper stage of transition of the cartilage to bone to permit of its being studied by this method. The preparations were made by taking the labyrinth with its capsule shelled out from the temporal bone, the foetus having been previously injected with Berlin blue. A celloidin preparation of the whole was made and cleared in creosote. The size of the embryo calf that could be used for this method was between 20cm and 30cm in length. Such preparations, when cleared in creosote and examined with a stereoscopic microscope, would readily show any communication existing between the blood-vessels in the endosteum and those in the capsule. In cases where the preparation could not be made transparent enough to permit of careful study, the object was removed from the creosote and thick sections were cut free-hand. Other preparations where the process of ossification was farther advanced were decalcified and both thick and thin sections were made in the ordinary way. Such preparations could be stained before studying them.

By working with this method communications between the blood-vessels in the membranous labyrinth and those in the capsule could be demonstrated at a number of definite points, and the occurrence of these connections was found to be quite constant in the several dozen preparations studied. A characteristic of these communicating branches is that they always consist of a single large vessel which enters the capsule alone, except that it is often accompanied by a vein which returns the blood from the capsule to the labyrinth.

Since the system of blood-vessels in the membranous labyrinth is developed long before any blood-vessels appear in the capsule, we would naturally not expect to find vessels which develop later in the capsule send branches in to supply the membranous labyrinth. A single exception to this was found in a number of preparations where a large arterial trunk from the capsule joined the crus commune near its distal end, and distributed branches to the endosteum and membranous structures of the semicircular canals in the manner described below. In all the remaining places where connections between the blood-vessels of the membranous labyrinth or endosteum and the capsule were found, these consisted of branches which had penetrated the capsule from vessels that already existed in the membranous labyrinth. The points where such communications were found are as follows:

Cochlea.

1. Branches from the labyrinthine artery which lie in the endosteum on the under surface of the basal coil send branches at right angles to themselves into that part of the capsule which covers the under surface of the basal coil. (Plate XIII., Fig. 2, 1.)

2. Branches from the network which the labyrinthine artery forms in the meatus acusticus internus penetrate the capsule about the meatus, and extend upwards to supply the part of the capsule which encases the basal coil. (Plate XIV., Fig. 2, 2.) Branches from the same vessels are also sent upwards to supply that part of the capsule wedged in

between the vestibule and the distal end of the basal coil. (Plate XIV., Fig. 2, 3.)

3. At the junction of the distal with the middle third of the basal coil, at the point where the vena spiralis posterior takes its origin, an artery of considerable size, lying in the endosteum of the scala tympani, leaves the endosteum and supplies that part of the capsule between the basal coil and the vestibule. (Plate XIII., Fig. 1, 2, and Fig. 2, 4.) A vein from the area supplied by this artery runs parallel to the artery from the capsule to the labyrinth, and forms the beginning of the vena spiralis posterior.

4. Vessels which lie in the endosteum of the scala tympani, along the anterior border of the fenestra cochleæ, in several preparations were seen to communicate through a few small branches with a network of vessels which supply the tympanic side of the membrana tympani secundaria. (Plate XIII., Fig. 1, 3.)

5. In several preparations, the arteries which arch over the scala vestibuli in the proximal end of the basal coil were seen to give off small branches to the capsule immediately above the coil. (Plate XIII., Fig. 1, 1; Plate XIV., Fig. 2, 5'.)

6. Branches of the labyrinthine artery which supply the modiolus communicate with the vessels supplying the capsule of the cochlea by extending out along the prolongation of the capsule which in the proximal part of the basal coil separates this coil from the one above. (Plate XIV., Fig. 2, 5.)

Vestibule.

1. Vessels from the labyrinthine artery which arch over the anterior surface of the vestibule to anastomose with branches from the anterior vestibular artery, send a large number of branches upward and forward into the part of the capsule immediately above the anterior part of the vestibule and the part wedged in between the vestibule and the distal end of the basal coil. (Plate XIII., Fig. 1, 1, and Plate XIV., Fig. 2, 6.)

2. The part of the capsule covering the posterior surface of the vestibule is, as a rule, supplied by a large vessel which

springs from the labyrinthine artery at the base of the cochlea. (Plate XIV., Fig. 2, 7.)

3. A large stem from the anterior vestibular artery arches over the anterior surface of the vestibule between the fenestra vestibuli and the ampulla lateralis, and penetrates that part of the capsule lying under the lateral semicircular canal. (Plate XIII., Fig. 1, 4, and Plate XIV., Fig. 2, 8.) Branches from this vessel are distributed to the utricle. A branch often continues in the endosteum across the vestibule to anastomose with an artery, which takes its origin from the posterior vestibular artery and crosses to the anterior surface of the vestibule between the fenestra cochleæ and the ampulla posterior. A second branch from these vessels to the capsule is sometimes given off near the base of the crus simplex of the lateral canal. (Plate XIII., Fig. 1, 5.)

4. A branch from the posterior vestibular artery was observed in several preparations to penetrate that part of the capsule lying between the canaliculus cochleæ and the ampulla posterior.

Semicircular Canals.

At no point in the semicircular canals were vessels ever found running from the endosteum into the capsule. On the other hand, at the distal end of the crus commune a large artery from the capsule was seen in a number of preparations to penetrate the endosteum and send branches to the membranous canals. The cartilage wedged in between the arches of the three semicircular canals in the embryo is penetrated by a number of nutrient canals. Figs. 1 and 2, Nc. An artery lying in one of these canals runs backward and inward until it reaches the distal end of the crus commune, where it takes the place of the artery of the crus and sends a branch to supply the endosteum and membranous structure of the crus commune and a branch to each of the posterior and superior canals. (Plate XIII., Fig. 1, 6; and Plate XIV., Fig. 2, 9.) In one preparation no branches were given off by this vessel to the capsule (Plate XIII., Fig. 1, 6), while in others a number of branches supplied the capsule.

Fig. 1.

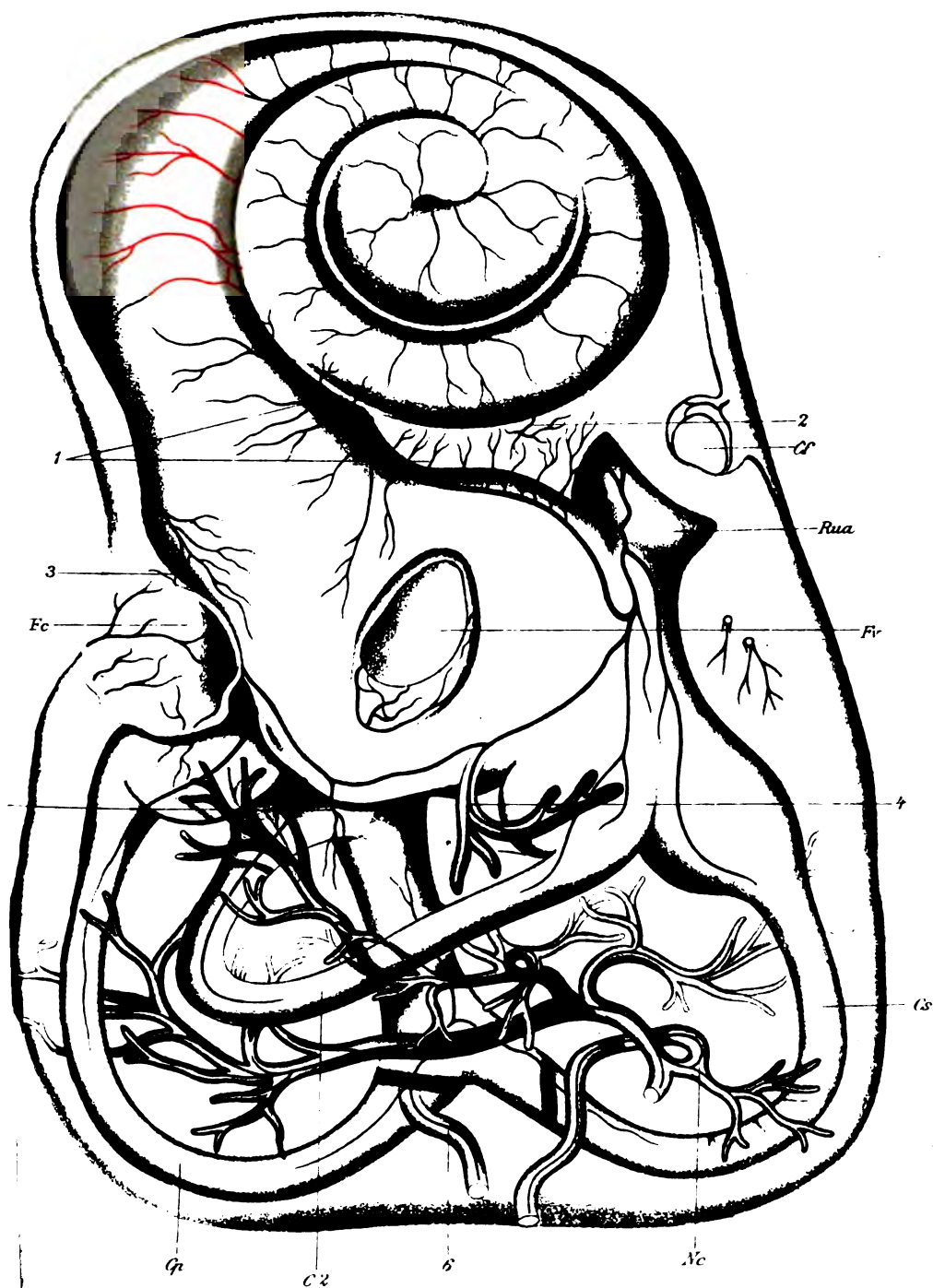
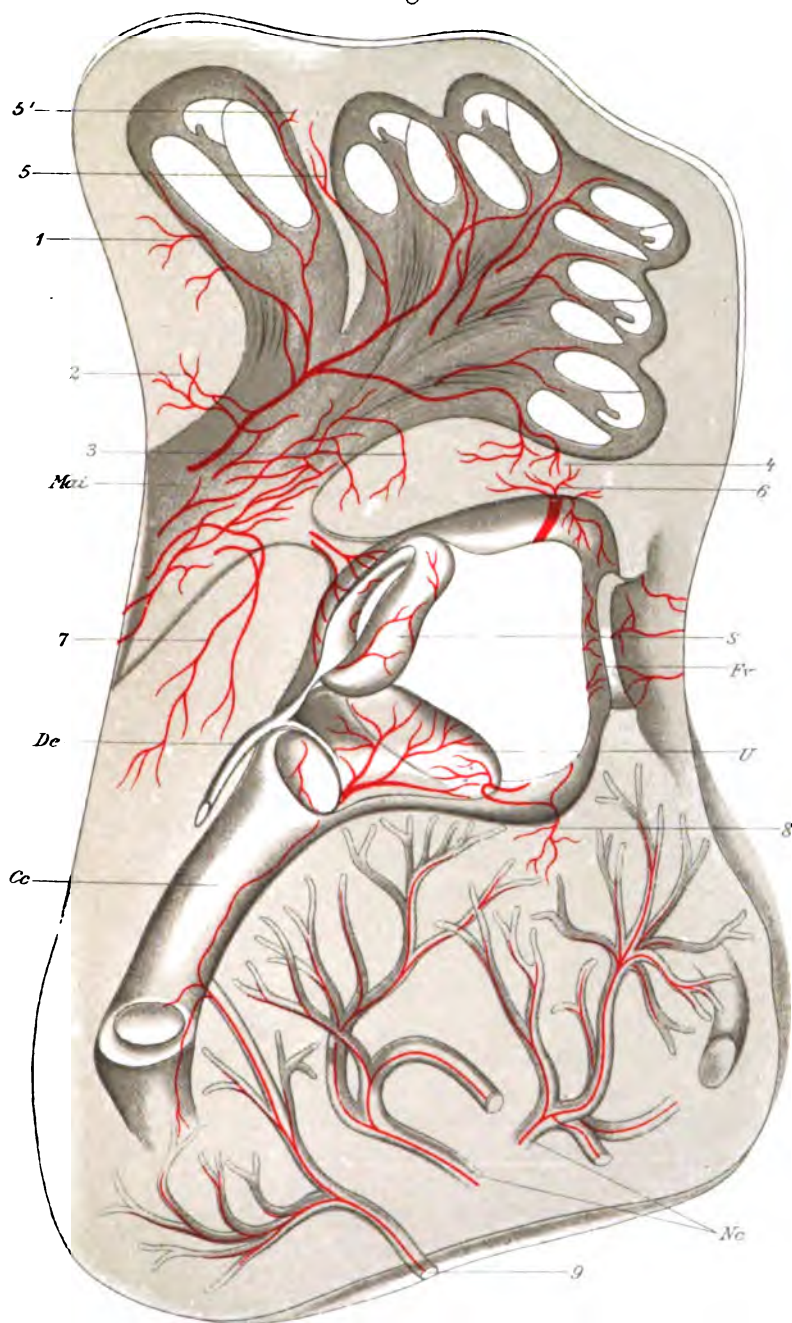


Fig. 2.



(Plate XIV., Fig. 2, 9.) Such an artery was long ago described by Sappey, but as far as I can learn his observation has never before been substantiated.

In summing up the results obtained in this research, in their bearing upon, first, the proposition of Hyrtl, that the blood-vessels of the labyrinth form a closed system, having no anastomoses with the surrounding structures from the time the labyrinthine artery penetrates the labyrinth at the bottom of the internal meatus until the veins leave the labyrinth; and second, the question of communications between the blood-vessels in the cavum tympani and those in the labyrinth, the following conclusions are reached:

1. The proposition of Hyrtl that the blood-vessels of the labyrinth form a closed system does not hold true for the labyrinth of the calf. At a number of places the ramifications of the labyrinthine artery send branches out into the capsule. The places are chiefly around the base of the cochlea and around the vestibule. In one place, the distal end of the crus commune, an artery from the capsule penetrates the endosteum and sends branches to the membranous canals.

2. In regard to the question of anastomoses between the blood-vessels of the cavum tympani and those of the labyrinth, such communications do exist apparently in the ear of the calf, for it has been shown that the part of the capsule of the labyrinth between the vestibule and the basal coil, the region which lies in front of the fenestra vestibuli, is well supplied by branches of arteries from the labyrinth from three distinct sources: first, branches from the arteries in the meatus acusticus internus (Plate XIV., Fig. 2, 3); second, vessels arching over the anterior surface of the vestibule (Plate XIV., Fig. 2, 6); third, a large artery lying in the endosteum of the scala tympani in the distal third of the basal coil (Plate XIV., Fig. 2, 4).

Since the blood-vessels in the mucosa of the tympanum penetrate freely the part of the capsule forming the inner wall of the cavum tympani, it is quite evident that in the calf, at least, communications between the blood-vessels of the cavum tympani and those of the labyrinth do exist.

Explanation of Plates.

Plate XIII.

Fc—fenestra cochleæ.

Cf—canalis facialis.

Rua—ramus utriculo-ampullaris.

Fv—fenestra vestibuli.

Cs—canalis semicircularis superior.

Cl— " " lateralis.

Cp— " " posterior.

Nc—nutrient canals.

1, 2, 3, 4, 5—Branches from the labyrinthine artery which supply the membranous labyrinth and endosteum, penetrating the capsule of the labyrinth.

6—Artery from the capsule of the labyrinth supplying the endosteum and membranous semicircular canals.

Plate XIV.

Mai—meatus acusticus internus.

Fv—fenestra vestibuli.

S—sacculus.

U—utriculus.

De—ductus endolymphaticus.

Cc—crus commune.

Nc—nutrient canals.

1, 2, 3, 4, 5, 5', 6, 7, 8—Vessels which supply the endosteum and membranous labyrinth, branches of the labyrinthine artery, sending stems into the capsule.

9—Artery supplying the capsule of the labyrinth, sending branches to the endosteum and membranous semicircular canals.

REPORT OF A CASE OF PANOTITIS RESULT-
ING IN MENINGITIS, WITH PATHO-
LOGICAL FINDINGS.¹

BY DR. GEORGE SLOAN DIXON,

SURGEON NEW YORK EYE AND EAR INFIRMARY; INSTRUCTOR IN OTOTOLOGY, COLLEGE OF PHYSI-
CIANS AND SURGEONS.

(With two photomicrographs on Text-Plate No. II.)

THAT panotitis is not more frequently reported is probably due to the difficulty of obtaining permission for autopsies, and possibly to the greater difficulty of preparing the organ for microscopic examination after the specimen has been obtained. The decalcification and sectioning of the temporal bone is a tedious, slow process, and after weeks of labor the result is often exceedingly disappointing. It is doubtful whether there is another portion of the human anatomy so difficult to obtain (in a fresh condition) as the temporal bone, due primarily to our laws, enacted of course for the protection and greatest good of the greatest number, and, secondly, to the apathy of those in charge of the dead. Removal of the temporal bone for pathological examination is the last thing thought of.

The case I have the privilege of reporting, through the courtesy of Dr. Gorham Bacon, is of interest, on account of its rather unusual course and the character of the infection.

Miss D. H., a nurse, forty-seven years of age, entered the service of Dr. Bacon, in the New York Eye and Ear Infirmary, February 7, 1904. Her chief symptoms were those of dizziness and staggering gait. She gave a history of an acute attack of

¹ Read before Section of Otology, New York Academy of Medicine, May meeting.

otitis media, which began six weeks previously with chill, pain, fever, etc. The attack had apparently run its course, and she was being treated for the resultant deafness. Four days previous to admission she was seized with great dizziness and weakness during an "examination of the left ear with a probe." There was no chill and no vomiting at this time.

Examination showed acute otitis media on the left side, a slight discharge, and a reddened and somewhat swollen drum membrane. There was no mastoid tenderness. The use of Siegel's otoscope caused marked vertigo when the air in the external canal was compressed. The condition of her hearing was not recorded. Her urine was normal.

During the subsequent three days she had several attacks of vertigo and nausea, and ran a slight temperature. I am under the impression she had slight aphasia, but there is no mention of this in the history. However, the symptoms did not seem to warrant operative interference up to this time. On the fourth day after admission she had a chill, there was slight mastoid tenderness, and the temperature suddenly arose to 103.7° F. There was great pain in the back of the neck along the spine; meningitis had occurred. The temperature remained high on the following day, and on the sixth day after admission fell to 100° just previous to death, which occurred February 13th, or about seven weeks after her first chill.

Autopsy.—The dura was adherent to the brain on each side of the superior longitudinal fissure from near the beginning of the first frontal convolution to the fissure of Rolando. There was marked purulent lepto-meningitis over the superior surface of both hemispheres. The process was, however, more marked at the base of the brain. There were a few adhesions about the medulla at the foramen magnum. The region of the left island of Reil was examined and found normal. The ventricles were free from pus, and the interior of both cerebellar lobes was normal.

There was no discoloration of, or opening through, the dura over the petrosa. When the dura was removed from the left petrosa pus was found on the inner aspect of the superior semicircular canal ridge, and the bone was carious at this point. Further dissection revealed fluid pus



FIG. 1.—Vertical section through tympanum showing (a) tympanum filled with granulation tissue and pus, (b) vestibule filled with pus, (c) foramen ovale with foot-plate of stapes, pus passing into vestibule on each side, (d) scala vestibuli, (e) facial nerve, (f) tensor-tympani muscle. From a photomicrograph by the author. $\times 35$ diameters, reduced.



FIG. 2.—Transverse section at about the middle of the first turn of the cochlea. (a) Internal auditory meatus; (b) modiolus infiltrated with pus, which is freely passing from (a) into (c) the scala tympani; (d) scala vestibuli, also containing pus. This cavity was not completely filled with celloidin, and contraction caused retraction of (e) Reissner's membrane. (f) Scala media, showing a small hemorrhage. From a photomicrograph by the author. $\times 65$ diameters, reduced.

in the left sigmoid sinus. The petrosa was then removed, and while this was being done pus was noted to ooze through an oval opening in the tegmen antri, 1.5 x 1 mm in diameter. The mastoid was soft and full of pus. The internal auditory canal was also filled with pus.

Sections of the bone show every cavity filled with pus or granulation tissue, or both. The stapes gives no evidence of caries, but it was partially dislocated, as sections show the foot-plate decidedly out of position and pus passing freely around it from the tympanum to the vestibule. (See Fig. 1.) There was considerable pus in the perilymph spaces of both vestibule and semicircular canals, but little within this portion of the membranous labyrinth; hemorrhages, however, were noted here.

The mucous membrane of the tympanum was enormously thickened, and the cavity filled with pus. The lower part of the membrana tympani was intact, but greatly thickened and hyperæmic.

The cochlea was sectioned from base to apex in the vertical plane. The scala tympani was filled with pus; less pus was found in the scala vestibuli, while there was little or none in the scala media, though a few hemorrhages were present, as in other portions of the membranous labyrinth already referred to. The round window was probably perforated.

The infective germ was Friedlander's pneumococcus.

The tract of infection to the meninges appears to have been through the oval window to the vestibule, thence to the vestibular nerves, and along the sheath of the seventh pair.

The interesting points in the case are that the patient had an acute purulent otitis media, which had apparently subsided, and was being treated for the resulting deafness. To my mind everything points to the stapes having been moved during the examination with a probe; the existing condition was aggravated, though there was little to indicate its extent until the fourth day after admission, when suddenly there was a chill, the temperature went up, meningitis occurred, and the patient was dead in thirty-six hours.

This case seemed to call for an investigation of my bacteriological examinations during the past four years. They were found to comprise about 1050 cases of acute and chronic purulent otitis, with and without mastoiditis; 2.75 % of the infections were Friedlander's pneumococcus, or more properly the bacillus mucosus capsulatus. Fifteen cases, or about 50 %, had existed for forty-two days and over before operation. Of these, two had perisinuous abscess with Bezold perforation; one had perisinuous abscess and cortical perforation with subperiosteal abscess; four had epidural abscess (one of which died of meningitis); one had panotitis and died of meningitis; and one had brain abscess, which also died. Six cases had subperiosteal abscess.

Of those cases which had existed under forty-two days, four promptly recovered after paracentesis, but mastoid operation was required on the remaining ten, and all did well except one patient who died of pneumonia.

INFECTIVE ARTHRITIS COMPLICATING OTITIS MEDIA.¹

By WELLS P. EAGLETON, NEWARK, N. J.

INFECTIVE arthritis is of peculiar interest to the otologist, because the original infection frequently comes from the ear.

The subject, however, does not appear to have had the attention which it demands; as a result of which, entirely different lesions, running distinct courses, with decidedly varied outcomes, and demanding altogether diverse lines of treatment, have been classified under the general term of infective arthritis.

A practical subdivision has been implied by Bloodgood which, undoubtedly, has therapeutic value, viz.:

First. Inflammation caused by the toxins of micro-organisms where the germs do not enter the joint; such might be called toxic arthritis.

Second. Invasion of the joint by micro-organisms themselves.

Third. Involvement of the joint by a neighboring osteomyelitis.

Toxæmic Arthritis.—To such belong most of the cases following sinus thrombosis. They are characterized by swelling of several joints, pain, and tenderness, but all symptoms usually disappear with rapidity. The fluid obtained by aspiration is sterile. It is the old rheumatism of toxæmia, well known to every general practitioner, especially in cases of scarlet and typhoid fever, and which, because of its

¹ Read before the Otological Section of the New York Academy of Medicine, February, 1905.

subsidence, without treatment, has often been the cause of postponement of early surgical intervention in cases of true infective arthritis.

CASE 1.—Under the care of Dr. Charles J. Kipp. Male, adult. Admitted to the Newark Eye and Ear Infirmary suffering from sinus thrombosis following otitis media. Several days after operation several joints swollen and inflamed with intense suffering. Gradual subsidence of all symptoms. Entire recovery.

CASE 2.—Seen in consultation with Dr. Frederick Baker. Male, aged twenty-four. Previous history negative. Never suffered from rheumatism. Otitis media suppurativa following coryza. Paracentesis made under nitrous oxide. Very profuse discharge. Temperature 101–103° F. One week later, pain in right knee, accompanied by only slight swelling. The next day the left knee similarly affected, and later both ankles, accompanying which a distinct pericardial or possibly an endocardial murmur could be heard, which was not present on the previous day. Gradual recovery.

This case is possibly one of acute articular rheumatism occurring independently of the otitis, which view is supported by the appearance of the heart murmur, but the continued septic temperature from the beginning of the otitis media until the subsidence of the joint affection, in association with the character of the joint lesions, made me regard it as toxic and not rheumatic.

The second class, which may be designated true infective arthritis, can be subdivided into as many divisions as there are micro-organisms capable of causing joint inflammation; the most common of these are the gonococcus, staphylococcus, streptococcus, pneumococcus, and the bacillus of typhoid and glanders. These vary in their virulence from the gonococcus which, but infrequently, causes a purulent arthritis to the pneumococcus which is, almost unexceptionally, purulent from its beginning.

Certain it is, that in the very large proportion of cases of infection of the synovial membrane, by the ordinary micro-organisms themselves, suppuration does occur; and unless

this is early recognized, not only is the joint sure to be greatly damaged, but the life of the patient seriously imperilled.

This has been conclusively demonstrated, especially in cases of pneumococcic infection, and is of particular interest to otologists because of the frequency (especially in children) in which the original point of entrance is from the ear.

Davis and Brown,¹ in an examination of thirty-nine fatal cases of multiple lesions, bacteriologically demonstrated to be caused by the pneumococcus, found an otitis media as the primary lesion in four, or about 10 per cent., and as a sign of metastasis in two more, while thrombosis of a sinus twice occurred. One of the four cases caused a suppurative arthritis of several joints, in addition to other lesions.

The ear, in fact, is the *most* frequent source of *general* pneumococcic infection in children. Netler states that twenty-nine out of forty-six cases, or about 63 per cent., originate from otitis media.

Dugeon and Branson,² in reporting five cases of pneumococcic arthritis, one of which originated from an otitis media, and another probably so, as autopsy showed "thick yellow pus in the right middle ear," say: "It has been our experience and that of our predecessors, that the pneumococcus practically monopolizes the etiology of infective arthritis during infancy, and about up to the end of the fifth year of life." They also say: "The character of the local lesion, in a typical case, is almost distinctive, the most striking feature being the nearly complete absence of circumarticular inflammation."

This latter fact was forcibly demonstrated in a case which I was allowed to see by the courtesy of Dr. P. V. P. Hewlett.

CASE 3.—Male, adult. Admitted to the Newark City Hospital suffering from lobar pneumonia. During convalescence right ankle *accidentally* discovered to be swollen, although the patient had made no complaint of pain or discomfort. A few

¹ *Lancet*, Oct. 8, 1904.

² *Lancet*, Aug. 1, 1903, p. 316.

days later joint opened and drained; purulent exudate, which contained large numbers of pneumococci in pure culture.

Osteomyelitis, with Secondary Arthritis.—The symptoms and diagnosis of acute osteomyelitis are now so well understood that when the lesion primarily occurs in the shaft of a long bone it is not apt to be overlooked, but when it complicates a general pyæmic condition, and involves a bone in the neighborhood of a large joint, the joint symptoms mask the original bone lesion almost completely, with the result that treatment may not be as satisfactory as it would be if the joint *and the bone* were both surgically attacked.

Acute osteomyelitis, with a joint complication, occurs almost entirely in young children, before complete ossification of the epiphysis, the site most frequently affected being the diaphysial end of the epiphysis, thus bringing the joint not only in close contact with the lesion, but in many joints within the joint capsule itself.

The younger the child, the more apt is the arthritis to be secondary to an osteomyelitis.

A case of sinus thrombosis complicated by infective arthritis following osteomyelitis, with spontaneous dislocation of both hips.

CASE 4.—Seen in consultation with Dr. Whiteneck. D.S., six years of age. Had had several attacks of otitis media. Following tonsillitis, pain in ear which continued for several days. Under ether, a paracentesis made. No pus found. Next day temperature 99° to 104° F., accompanied by two chills. Blood examination showed marked leucocytosis. Following day another chill accompanied by a rise of temperature from normal to 104° F. Was admitted to the Newark Eye and Ear Infirmary and operated upon that night. On way to Infirmary complained of pain in right knee, but no importance attached to complaint.

Operation.—No pus in antrum or mastoid but a thrombus in sinus low down towards jugular bulb. Free bleeding from above but none from below. Jugular partially excised. Above facial, where lower end of thrombus could be seen, the open jugular wall sewed into external wound.

Following operation, temperature continued high. Twenty-

four hours later, another chill, great pain in right knee, dressing removed, and sterile normal salt solution syringed from above out through wound in neck. Next day, complained of pain in both knees, patient lay stiffly in bed unable to turn from side to side, but examination revealed only slight dry crepitus of both hips; no redness or swelling of either hips or knees. On third day after operation, examined by Dr. Sydney Twinch. General septic condition; temperature from 102° to 105° F. One week later, left hip found to be dislocated upwards onto the dorsum of the ilium. Joint aspirated. No pus found. Extension apparatus applied. Three days later, exactly two weeks after sinus operation, abscess around joint opened and drained. Three days later, right hip found dislocated in same way, followed by abscess, which was also opened and drained. Both hips could be easily reduced, but it was impossible to keep them in position. From this time on for next four months, profuse discharge from both joints, several openings being made at different times.

Five and a half months after original operation, all sinuses healed. Child could sit comfortably, but was able to walk only with the aid of two crutches. Both hips still dislocated. Radiograph showed erosion of both heads of the femurs, showing that the case was probably originally an acute osteomyelitis of the epiphysis, followed by an infective arthritis, thus explaining the dislocation before any effusion into the joints.

The prognosis of toxæmic arthritis is excellent both as regards the life of the patient and the mobility of the joint.

In true infective arthritis and that complicating osteomyelitis, the mortality is very high, while the mobility of the joint is almost sure to be seriously impaired, if not altogether lost. In an examination of 79 cases of pneumococcic arthritis, being all that I could find reported, 48, or 60 %, died.

The treatment depends altogether upon the class to which the arthritis belongs. An inflammation of a joint appearing during the course of an otitis media, or a sinus thrombosis, warrants aspiration at once. If examination of the fluid by cover-slips and cultures demonstrates it to be sterile, rest, and the placing of the joint in proper position, may be all that is necessary. If over-distention by fluid is

threatened, repeated aspirations may be required. Placing the joint in proper position, in such cases, is highly important, as spontaneous dislocations, from distention, have been reported. When a joint contains pus, it should be promptly opened, although cases of recovery, following aspiration, rarely occur. Nevertheless, in every case in which the aspirated fluid contains pathogenic micro-organisms, even if the synovial fluid is not *purulent*, the best results are obtained by opening the joint and inserting a guttapercha drain.

This was demonstrated in a case under the care of my colleague, Dr. Seidman, in which, following an otitis media, several joints became involved: one (the sterno-clavicular) was opened; no pus was found, but a roughness of the articular surfaces; the inflammation subsided immediately. Another joint (the knee) was not opened, because the fluid aspirated was not purulent; here the inflammation continued, and within a few days the fluid was purulent.

In Dr. Halstead's clinic, where early opening on bacteriological examinations has been in vogue for the past six years, it has been demonstrated that such a procedure not only greatly lowers the mortality, but also, instead of interfering with the mobility of the joint, actually prevents immobility by cutting short the suppuration.

DOUBLE MASTOIDITIS COMPLICATED BY AN
INTERCOMMUNICATING SUBOCCIPITAL
ABSCESS.

By HENRY B. HITZ, M.D., MILWAUKEE.

IN presenting the following case for record, I wish to state that, in an experience of 130 mastoid operations for all causes, it stands absolutely unique; nor has search of the literature at my command been successful in bringing to light anything of a parallel character.

Politzer,¹ in his description of mastoid complications, says: "The breaking through of the abscess on the inferior and medial sides of the mastoid process often leads to complications of *long duration*, as the pus extends to the subfascial layers of the neck." Oppenheimer² states that "in rare cases there is a tendency to extend backward toward the region of the splenius muscle, a case being reported by Swan in which a trapezius abscess was formed, . . . complete recovery" following operation. In considering the direction pus invasion of this region may take, he says: "It may find its way forward along the track of the digastric muscle, and point in the pharynx, or backward toward the nucha and spinous processes of the cervical vertebræ, but always remaining beneath the deep fascia of the neck."

C. V., aged fifty-seven, male, German, married, shoemaker and farmer. Has four children living and well.

On August 5, 1904, he was referred to me while suffering from considerable pain in and behind the left ear, and a copious foetid

¹ *Diseases of the Ear*, 4th Edition, 1902, p. 530.

² Remarks on Bezold's Mastoiditis, *Laryngoscope*, xv., 1905, p. 51.

purulent discharge from the left auditory meatus. He gave the following history: General health had always been good. Never had syphilis or other venereal disorder. In April, 1904, he was suddenly taken ill with grippe, complicated later by an acute otitis media of the left ear, with severe mastoid pain. After several days the drum ruptured spontaneously, discharging at first sanguino-serous, and later purulent, matter. A physician in his home town made a cut behind the ear (Wilde ?), the opening of which remained but for a short period. The pain lessened somewhat, but has continued to the present time, while the purulent discharge has been continuous and foetid.

The patient is a large, well-preserved man, weighing about 170 pounds.

On examination the *left ear* showed a copious, foetid, purulent discharge in the meatus, which, on being removed, rapidly reappeared through a large perforation of the membrana above the short process. There was marked sagging of the posterior-superior wall of the canal. Behind the auricle was a scar about one inch long. The mastoid over the antrum was extremely sensitive to pressure. No bulging or œdema, however, was present. One very noticeable peculiarity was the rigidity of the neck, considerable pain being complained of upon forcible rotation of the head, but could not be localized, nor was there any external manifestation of trouble in the region of the neck.

The right ear showed scaling of the meatal walls and some thickening and retraction of the drum, though the malleus was clearly defined.

There was no sagging of the posterior wall of the canal. Hearing distance for the watch tick, by air conduction $\frac{1}{4}$. Careful examination of the mastoid region on this side failed to reveal any apparent disturbance, deep pressure over this antrum being negative, except for the neck pain previously mentioned. His temperature was 100° F., pulse rate 98, and he complained of sleeplessness.

He was sent to the Knowlton Hospital, and on the following morning a radical (Stacke-Schwartz) operation was performed on the left mastoid. Extensive caries was found to exist, the dura being exposed over the antral and attic vault. The mastoid tip was laid bare and completely removed, as was the outer table as high as the zygomatic cells. A tongue flap was made of the membranous canal, and the wound closed primarily. Recovery

was apparently rapid, the external wound healing without reaction. The temperature, which had ranged between 99° and 100°, dropped to normal on August 7th, and remained so until August 13th, when at his urgent request the patient was permitted to leave the hospital and come to the office for subsequent dressings. This was done through the enlarged external canal, and consisted of dry packing with iodoform strips. The only adverse symptom was a continuance of the stiffness in the neck, now apparently localized in the region of the mastoid attachment of the left sterno-cleido-mastoid muscle, but sometimes referred to the opposite side of the neck. Frequent examinations were made of the right ear, but failed to develop more than as stated above. On August 18th, however, after a night of restlessness and some dull earache, and as his temperature taken that morning in the office registered 99°, paracentesis of the membrana was done, but with negative results.

On August 22d some slight œdema over the right mastoid was observed, and deep pressure over the antrum seemed to cause increased pain in the neck. As I was going away for a few days, I suggested to my associate, Dr. Seaman, the advisability of making an exploratory operation on the right mastoid. During my absence, August 26th, the right mastoid was opened (Schwartz) by Dr. Seaman, and found to be extensively necrotic with a large sequestrum involving the inner table over the lateral sinus. The pus was of a thick creamy character, and the cavity was filled with detritus and flabby granulations. The outer table was completely removed and the wound packed with iodoform gauze.

Temperature before operation was 99°, pulse 84, respiration 18. During the following week the temperature ranged between 97° and 100° after which it remained normal until September 3d, when I again took charge of the case. Both mastoid wounds were clean and granulating nicely, while the patient's general condition was apparently good, although the stiffness in the neck, making it impossible to turn the head, still persisted, without, however, any external manifestation of trouble in this locality, either anteriorly or posteriorly, nor was any demonstrable with the aid of a throat mirror. This persisted until September 25th, though in every other way he seemed to be progressing satisfactorily. The *left ear* cavity (Stacke-Schwartz) had become covered with epithelium, excepting one small area

in the floor of the tympanic cavity. Temperature ranged between 98° and 99°.

On September 26th, while examining the neck by deep pressure over the site of the occipital artery on the *right side*, pus was forced into the right mastoid wound cavity (Schwartz), which up to this moment had been absolutely clean, and upon further investigation, by continuous deep pressure, pus could be seen welling up through a small opening in the innermost part of the antral floor. A probe was passed for fully an inch into this opening in a downward and forward direction, and its removal was followed by a copious flow of thick creamy pus. On the following day the right mastoid wound was reopened and thoroughly explored. An incision was carried backward as far as the lambdoidal suture, the flap reflected downward, and the base of the occipital bone carefully explored. A blunt probe revealed the presence of a pocket of thick pus beneath the occipital attachment of the deep muscles of the neck. During the exploration of this pocket, attention was called by the anæsthetist to the other (left) ear, from the external meatus of which *pus had begun to flow* in considerable quantity, first clear, then bloody, and later becoming watery during flushing of the right wound. At this time the *left ear* (Stacke-Schwartz) was practically healed, with the exception, noted above, of a small area of granulation in the floor of the cavity, and had been continuously clean and free from the slightest suggestion of pus, beyond that which might come from the small granulating area.

The right wound was carefully explored to determine the line of communication with the left ear, but this was unsuccessful. A large counter-opening was then made in the back of the neck, two inches behind the sterno-mastoid and the same distance below the occiput; free drainage was established, connecting with the mastoid wound, and moist dressings were applied. The left ear was also cleansed and a loose packing inserted. The patient rallied rapidly from the operation.

The wound on the right side was dressed daily with a moist boric dressing, while the left ear was carefully cleansed with a boric solution, although no more pus appeared and the cavity seemed to be in the same thoroughly clean condition as before.

The temperature until *October 9th* ranged between 98° and 99°. On this day it went to 100°, but dropped again after thorough cleansing of the drainage tube. The stiffness and pain in the

neck at this time had greatly decreased, and the nights were quiet and restful. On October 12th, the temperature again rose to 100°, and until the 17th ranged between 98° and 100°, when it again dropped to a daily range of 98° to 99°. This last rise of temperature was due to the development of a deep swelling on the *left side* of the neck, corresponding to the site of the drainage opening on the right side, about the region of the occipital artery, which, on October 16th, was opened, under local anæsthesia, and drained of a considerable quantity of pus, of the same character as that obtained on the opposite side.

At this period the patient's general condition, with the exception of loss of weight, was greatly improved. Granulation progressed steadily in the right ear (Schwartz), the large wound cavity having practically closed, and gave no further trouble. The *left ear* (Stacke-Schwartz) still showed a small bead of pus on the floor of the tympanic cavity, the wound otherwise having become covered with epidermis. The most recent wound in the neck (beneath the left side of the occiput) drained copiously at first, but the flow gradually diminished. From this time until November 7th the temperature remained normal. On November 10th it rose to 100.8°, and on the following day the patient again complained of considerable deep-seated pain on the *left side* of neck, and inability to rotate the head. On November 13th, after a restless night, swelling was noticed over the left occipital region, extending almost to the site of the mastoid scar and down the back of the neck, and he was again placed on the table. Under ether anæsthesia, a free vertical incision three inches long was made along the course of the drainage sinus, down to the base of the occipital bone. Careful exploration, almost to the left condyle, opened up a pocket of pus, under the periosteum, which extended laterally to the region of the partially obliterated digastric fossa of the temporal bone, one recess of this pocket going up on the occipital bone to the middle of the lambdoidal suture. The manipulation of this pocket again forced pus into the left (Stacke-Schwartz) ear, so that it was necessary to reopen the ear cavity by a second clean incision parallel to the old scar behind the ear. After careful exploration, the only spot found to be at fault was the small area of granulation around an opening in the floor, which admitted a small probe downward into the subcranial tissues. All the denuded occipital bone was thoroughly curetted. In the light of past trouble in this case it was

deemed best to leave both wounds widely open, and they were solidly packed with iodoform gauze, the suboccipital opening being reinforced with a drain. After the first dressing, which seemed by the complete absence of pus to indicate a thorough result, the mastoid wound was closed by a pressure dressing and rapidly healed without any further set-back. The suboccipital wound was allowed to heal by granulation. The subsequent history of this case is uninteresting, recovery from this time forward being uninterrupted. The temperature, which up to November 22d had ranged from 98° to 100°, dropped to normal and remained so. The patient was discharged December 20th cured, but is still kept under monthly observation.

In conclusion it may be well to emphasize the three peculiar features of this case:

First: The complete absence of any of the classic symptoms or physical signs of mastoid involvement on the right side, as has been pointed out.

Second: The involvement of the adjacent suboccipital region, without previous development of any intracranial lesion—a remarkable condition considering the amount of destruction of the inner table on both sides.

Third: The remarkable migration of pus beneath the occipital bone from one temporal region to the other. The line of communication was probably under the periosteum posterior to the os magnum and beneath the occipital attachment of the deep muscles of the back of the neck.

The case is undoubtedly of the class known as Bezold's mastoiditis, but differs from the usual form, in that it travelled laterally along the under side of the occipital bone *beneath the periosteum*, parallel with the muscular insertion, and did not appear on the surface behind the mastoid apophysis.

ELECTROLYSIS IN THE TREATMENT OF CHRONIC EUSTACHIAN STENOSIS.¹

BY FRANK T. HOPKINS, M.D., NEW YORK.

THE use of electrolysis in the treatment of chronic stenosis of the Eustachian tube is a method well known to all otologists and has its advocates and its opponents. I need not therefore take your time by reviewing the subject or by going into all the detail of method which has already been carefully presented to you during the last few years. I wish now to consider merely some essentials of technique which are occasionally overlooked, and to offer, as the result of a considerable experience, a suggestion in the use of the bougie which may give better results in certain severe cases. Electrolysis, rightly employed, can be of great benefit in the treatment of chronic catarrhal stenosis of the Eustachian tube, and therefore is an important factor in curing those cases of deafness and tinnitus which are dependent upon this pathological condition.

The symptoms which bring the patient to us are deafness and tinnitus, which may occur separately or in combinations of varying degrees of severity and persistence. Sometimes the tinnitus is apparently the important symptom—so much so, indeed, that the deafness may be overlooked by the patient, and only discovered after the usual tests have been made. Again, however, deafness is the prominent symptom, while tinnitus is so slight and so infrequent that it does

¹ Read before the Section on Otology of the New York Academy of Medicine October, 1905.

not cause the patient any especial discomfort. And further, in other cases we may have tinnitus and deafness coexistent and equally severe and annoying.

Since, however, both deafness and tinnitus may exist in the same degree, without any stenosis of the tube, it is necessary at the outset to learn whether stenosis is present, its character and degree, and, if possible, to what extent the symptoms are dependent upon the stenosis. The existence of stenosis is easily determined by the use of the Eustachian catheter. Setting aside those obstructions to inflation which are due simply to the accumulation of more or less viscid fluid in the tube or about its pharyngeal opening, we shall find, in general, that inability to inflate the middle ear is due to stenosis of the Eustachian tube,—a stenosis which may be either hypertrophic—that is, œdematous in character—or hyperplastic. Simple inflation will generally relieve, and may eventually cure, hypertrophic stenosis; but if the narrowing be very great, or if there occur at points along the tube deposits of new connective tissue, constituting a hyperplastic inflammation, then inflation will not be successful, and no amount of repeated inflations will overcome the narrowing of the tube.

In such an event, then, dilatation offers the natural relief for the stenosis. If the narrowing be slight and the resistance be not severe, a cotton dilator or a bougie may be used with some advantage, although the patient will suffer severe pain through its use. If, however, the stenosis be very great, a cotton dilator is out of the question, and a bougie is unbearably painful, and often impossible to pass; or, if passed, the force necessary to accomplish this is more than likely to produce abrasions of the mucous membrane. And further, even if dilatation is accomplished without injury to the mucous membrane, the result is not as lasting as it is under electrolysis, and the constant repetition which is necessary renders the patient again and again liable to these injuries. It is here that electrolysis is of great advantage, enabling us easily, and with far less pain, to pass through the lesser degrees of stenosis; and without great difficulty and with no injury to the lining membrane of the

tube, to pass through the very narrowest strictures. We do not say that in these severer cases the first application of electrolysis is painless, but it is reasonable to believe that the pain which may be excessive without electricity will be much less severe where the action of the electric current is used to relieve the congestion and œdema; and at every subsequent application it will, as a rule, be found that there is less and less pain and less resistance, so that the obstruction which will at first scarcely permit a number one (French) bougie to pass through, will afterwards easily and almost painlessly allow the passage of larger bougies.

What then are the objections to the use of electrolysis? Apparently the chief objections are based on a fear of certain dangers which attend the operation. But while it cannot be said that these dangers are imaginary, we do claim that they are greatly exaggerated, and that the fear of them is largely due to unfortunate experiences which have resulted from the faulty methods employed by inexperienced operators. Indeed, these objections seem to be the usual objections which any new method encounters, namely, the haste of careless or ill-advised operators to take up that which is new, and the reaction in sentiment which naturally follows their failures.

Amongst the causes of failure one, perhaps less common now than formerly, is the disregard of the diseased condition of the naso-pharynx. Without careful attention to these parts it is almost useless to try to benefit the tube, for the catarrhal condition of the tube is usually but an extension of the same morbid process from the naso-pharynx; and while the latter disease continues unchecked, the tube cannot be permanently benefited. It is, therefore, necessary to remove all adenoid vegetations, especially those about the pharyngeal opening of the tube, and to make sure that any cause of obstruction, such as spurs, polypi, or enlarged turbinates, are given proper treatment, in order that the chronic catarrhal condition of the naso-pharynx shall be reduced to the minimum.

We may now pass to a consideration of those errors which are the result of faulty methods. Of these errors the lack

of aseptic care is one of the most important. Considering how many conditions are necessarily present which must militate against asepsis, we should be the more careful to render all our work as aseptic as possible, not alone in sterilizing our instruments, but also in cleansing the nasal cavity; and finally, by a preliminary inflation of the tube, relieve it of the mucus and pus which may be lodged in it. These are the important preliminary steps, and I do not believe, if these things are carefully attended to, that inflammations, abscesses, or other septic conditions will occur to discredit the operation or to discourage the surgeon.

Care regarding the electric current is another important matter, both as to its polarity and as to its strength. Now, while it goes without saying that the bougie should be attached to the negative pole, yet it seems more than likely that this precaution has been neglected in those cases where the bougie has broken off in the Eustachian canal. Nor should the surgeon leave this all-important matter to conjecture, but he should make it his habit every time to look and see that the pole is rightly placed. The action of the current should be tested before using, and the current must be turned off before the bougie is introduced into the catheter, and after its use it must be turned off again just before the bougie is withdrawn from the catheter.¹

The utmost gentleness should be exercised in passing the bougie into the canal. If the surgeon from lack of experience has not the sense of touch which enables one to know when the bougie is really in the tube, he may wisely begin by determining the proper position of the catheter by a preliminary inflation, and then, still holding the catheter firmly in place, let him introduce the bougie through the catheter, when it must necessarily pass from the catheter into the tube. But after the bougie has once been used, whether successfully or unsuccessfully, inflation must not again be employed at that sitting, whether for the purpose of locating the position of the tube or for testing the clearness of the tube after the passage of the bougie; for such an in-

¹ But while the bougie is in the Eustachian canal the current must be continued.

flation is very liable to cause subcutaneous emphysema,—always a disagreeable, and sometimes a very serious accident. If by ill-chance the bougie has not entered the Eustachian canal, but has made a false passage, and blood is found on the bougie upon its withdrawal, it is well to make an application of nitrate of silver, an 8 per cent. solution, in the region of the mouth of the tube as a precaution against septic infection.

When, however, all has gone well, and the bougie is in the canal, the current should be turned on slowly. For this operation we find that forty volts will best overcome resistance, while from two to five milliamperes will give sufficient intensity. The passage of the bougie through the Eustachian canal should be made slowly and carefully, with not more than one milliampere of current until the point of obstruction is reached; then the current may be increased to two or three milliamperes—rarely to five—and the bougie advanced with firm and steady pressure until the stricture is passed, while the middle or the ring finger is held against the catheter to prevent a sudden advance of the bougie in case the stricture gives way unexpectedly soon. Then with the same slow motion, if no other obstruction be encountered, push the bougie on until it begins to enter the middle ear. Here, of course, it should stop; although, if the motion has been slow and guarded, it will not cause injury even if it impinges on the posterior wall or comes in contact with the tympanic membrane.

As it is not always possible by mere sense of touch to appreciate the precise moment of the passage of the bougie out from the Eustachian canal into the cavity of the middle ear, I wish to call your attention to a fact noted by my colleague, Dr. Kenefick, namely, that the patient himself will indicate this moment by an involuntary and peculiar expression of countenance which Dr. Kenefick has called the "tympanic expression," and this may always be observed when for the first time the bougie enters the tympanic cavity. On the other hand, the absence of this expression should indicate that the bougie has not been carried entirely through the Eustachian tube.

We come now to what I consider and claim to be the all-important part of this method of treatment, namely, the degree of dilatation to be employed. Beginning always with the smallest bougie, which is No. 1 (French) (that is, one third millimetre in circumference), we may, from time to time, at varying intervals, use other and larger bougies, Nos. 2, 3, and even 4 (French), according to the conditions of the case. As far as my own experience has led me to judge, I regard it as a mistake to rest satisfied with the dilatation accomplished by a No. 1 bougie, for in many such cases contraction inevitably occurs later. I believe in wide dilatation. Accordingly, it is my custom to begin with a No. 1 (French) bougie, using it at intervals until it is very easily passed, and then to use a No. 2 bougie in the same way, and finally a No. 3. The bougie is used at intervals of two weeks to four weeks, according to the effect which is produced on tinnitus or deafness, and according to the amount of inflation obtained. After three months or more the next larger bougie is employed.

Meanwhile a nasal spray, varying in character with the different cases, is made use of by the patient, and two or three times a week inflation is given, generally with a medicated vapor. Always bear in mind the importance of inflation, and do not neglect it. Remember that the dilatation of the canal is not the final object of our treatment, but that dilatation is employed only as a means by which the cure of the catarrhal disease may be successfully accomplished. For such a success, however, we must rely upon perfect and repeated inflation.

Of course the harder, firmer strictures, and especially the tubular strictures, will require a longer time for successful dilatation, and in these cases it will be found more difficult to pass from a smaller to a larger bougie. In these cases, also, there is always a greater inclination to subsequent contraction, so that it becomes necessary, after dilatation with the largest bougie appears to be satisfactory, to repeat the electrolysis regularly every six or eight months. In my own practice I have had a few cases in which little or no improvement was obtained in tinnitus or in hearing with the

passage of a No. 1 bougie, although the inflation was better, but which improved decidedly after the larger bougies were passed. And many cases prove that the increase in hearing and the lessening of tinnitus is proportional to the degree of dilatation.

UNTRANSLATED ARTICLES FROM VOL. XLII.,
"ZEITSCHRIFT FÜR OHRENHEILKUNDE."

ABRIDGED TRANSLATION, BY ADOLPH O. PFINGST, M.D.,
LOUISVILLE, KY.

A TROPICAL AFFECTION OF THE EARS.

By RICHARD MUELLER, Berlin.

TWELVE or more cases of a disease which seems to be peculiar to tropical regions were observed by the author. The disease, which occurred in patients between the ages of twenty-three and forty-five, and which in all but three instances affected both ears, was characterized by the insidiousness of its onset, a gradual loss of hearing being its most marked subjective symptom. Along with this there was a feeling of fulness in the affected ear, a gradual development of subjective noises, and the formation of a boggy swelling of the soft parts of the meatus. This swelling, in a few cases, gradually subsided without having greatly inconvenienced the patient, but in the majority of the cases the swelling was accompanied by severe pain in the ear lasting from several hours to several weeks or months. Elevation of temperature was noted in only one of the cases. This painful stage was always followed by a long chronic stage, during which permanent pathological changes developed. They consisted in the formation of exostoses and marked hyperostosis of the bony wall of the auditory canal. The enlargements were all single, multiple exostoses not having been observed. The bony growths were found on every wall of the canal except the superior, and varied considerably in size, the largest extending about two-thirds across

the lumen of the meatus. The skin over the growths was always more or less hyperæmic. Deafness and subjective noises on the affected side were always complained of. The character of the noises differed, being variously compared to the blowing of air, the rushing of water, ringing of bells, etc. The defect in hearing also varied, one patient being able to hear the whispered voice only when spoken very close to the ear, while in some it could be heard at 4 metres or more. With the reduction of perception for speech, a proportionate fall in the upper limit for notes was also observed. Dizziness was never complained of.

As only three of the cases were given treatment, the author was not able to determine the effect of therapeutic measures on the course of the disease. In every instance spontaneous improvement was noticed with the return of the patient to his former home or with removal from the unfavorable climatic environments, and a final complete recovery of function and disappearance of the subjective noises.

Conditions similar to those found by the author have previously been observed by other practitioners in the tropics. Plehn described a condition seen by him in Europeans residing in the tropics, characterized by pain in the ear of five to eight days' duration, along with swelling in the ear canal which almost occluded the meatus. He reported a complete restoration of the function and return of the parts to normal. Riege and several other naval and army surgeons, who observed identical cases in San Domingo and the West Indies, also reported complete recovery. None of the patients in whom the disease was observed gave the history of former ear trouble. In those cases in which permanent bone changes develop, long-continued or permanent subjective noises were the rule. It seems probable that with the hyperæmic condition of the meatus an associated hyperæmia of the labyrinth may exist, which would account for the tinnitus. The possibility of inflammatory changes in the labyrinth should, however, also be considered.

Based upon his own observations and the observation of others, the author suggests a division of the cases into: A.

Mild cases, in which there is only a slight diffuse inflammation of the skin of the meatus and which terminate in complete recovery; B. *Cases of medium severity*, in which the periosteum is involved in the inflammatory process with resulting permanent bone formation, but in which the defect in hearing and subjective noises last only a short while after the inflammatory stage of the disease; and C. *Severe cases*, in which the bone formation is extensive and permanent, and in which the disturbed function and subjective noises, probably the result of labyrinth changes, persist for a long time after the disease in the meatus has run its course.

TRAUMATIC ATRESIA OF THE AUDITORY CANAL.

By Dr. RUDOLPHY, Breslau.

Twelve cases of traumatic atresia of the ear canal, all that could be found in literature, are briefly reviewed by Rudolphy, and an additional case from his own practice is reported more in detail. The cases nearly all resulted from burns, injuries by strong acids and alkalies, or by ulceration in the canal secondary to long-continued otorrhœa. It has been a common observation that extensive laceration of the auricle and ear canal, even to complete destruction of the auricle, is not frequently followed by atresia of the canal. On the other hand, two of the reported cases of atresia followed only a partial separation of the auricle from its attachments.

The author's case of traumatic atresia occurred in a man who was kicked on the chin by a mule, with a resulting compound fracture of the inferior maxilla and injury to both ear canals. Examination soon after receipt of the injury revealed a swelling on the floor of the right meatus, about 3 to 4 mm from the drum, from which blood was exuding. The left ear canal was found full of clotted blood and was extremely sensitive to pressure. The canal was irrigated at once with a sublimate solution and packed with gauze. It took about two weeks for the blood to clear away sufficiently to recognize the fractured area. It could then be seen as an elevated open area very much as though a nail had been driven through the bone. Two weeks later con-

siderable scar tissue had formed over the prominence, so that a small slit along the upper and posterior wall of the canal was all that was left of the lumen of the canal. Hearing was normal. The lumen continued to grow smaller, so that two months after the injury a probe could be passed with difficulty through the stricture. Hearing had been reduced to almost total deafness; however, sounds from a tuning-fork at the vertex were most readily perceived on the affected side. When this patient was seen about eight months later, an hour-glass constriction, at the depth of about $1\frac{1}{2}$ cm, completely occluded the left meatus, so that a probe could not be passed. The constricted portion seemed rather soft and was covered with epithelium.

A fracture of the anterior wall of the ear canal had evidently resulted in this case and the cartilaginous canal been torn from its bony attachment. The sound-perceiving apparatus had apparently not been injured. The case demonstrates the advisability in such accidents of avoiding infection of the meatus, and of endeavoring to prevent atresia by immediately replacing displaced fragments of bone, and keeping them in position with a firm cotton tampon, gauze making insufficient pressure. After a stricture has begun to be established, a tampon, or even the wearing of a canula for several months, will not prevent an increase in the swelling and consequent atresia of the canal. Ostmann has employed electrolysis at intervals of eight to ten days with good results in non-traumatic atresia of the meatus. He believes that the current prevents the formation of scar tissue or at least lessens it. In most cases surgical measures have to be resorted to. The most satisfactory method of removing the obstructing tissue after it has formed is the one suggested by Koerner. An incision is made behind the auricle, the cartilaginous canal severed from its surroundings, and any osseous constriction removed by means of chisel and hammer. A flap is made in the membranous canal posteriorly and the canal tightly tamponed. Jansen has modified this operation by making one flap backward from over the mastoid for the posterior wall, and another from the posterior surface of the concha for the anterior

wall. He reports two cases operated upon by this method with good results. Operative interference is imperative in all cases of atresia accompanied by otorrhœa, and is justifiable in cases where the atresia interferes with the conduction of sounds through the natural channels when a good perceptive organ can be demonstrated by acuteness of perception through the bone.

THE POSITION OF THE MANUBRIUM IN THE NORMAL DRUM.

By Dr. BRUNZLOW, Rostock.

Steinbruegge is given credit by the author for having been the first to point out the asymmetry of the two drums in the human. C. Hasse subsequently examined the drums in a large number of subjects with reference to the position of the malleus, and found that it nearly always appeared more horizontal on the left than on the right side, and that the light reflex on the right drum was directed downward and forward, while on the left side it pointed almost directly downward. This asymmetry although also noted in children was not so apparent at that time of life as in the adult. Hasse found among a hundred soldiers that the left malleus was unmistakably more horizontal than the right in every case, and even in those cases where both drums were retracted the left malleus showed the most inclination toward the horizontal. The examination of a large number of ossicles by R. Bloch shows that the angle formed by the union of the body and the long process of the malleus was always more obtuse on the right side than on the left.

To note the difference in the position of the manubrium, the author divided the outer or larger end of an aural speculum into nine equal segments, with very fine wire radiating from the centre or crossing point and attached at the edge of the speculum. As the zygomatic arch is believed to correspond to the horizontal meridian of the erect skull, this is chosen as the landmark for the author's measurements. With a little practice the horizontal intersection of the speculum can be placed parallel to the zygomatic arch, and then by getting the point of decussation of the wires over

the umbo the difference in the position of the handle of the malleus can be determined. Of almost 300 drums examined, almost equally divided between the left and right side, an angle of 40° to 50° was noted between the manubrium and the horizontal meridian. The average for the left side was 45° , while for the right side it was 51.6° . Of 149 cases in which both ears were examined, the angle was found to be identical on the two sides 73 times, largest on the left side 24 times, and largest on the right side 52 times. The usual difference between the two sides was from 5° to 10° . At present the author can see little advantage in this anatomical observation for the recognition of pathological conditions, but believes that it is well to take in account the tendency for the left manubrium to incline toward the horizontal in the examination of all drums.

CEREBELLAR ABSCESS AND SINUS THROMBOSIS.

By Dr. Voss, Riga.

A man of thirty-one years, who had received a blow on the right ear ten years previously, complained suddenly of severe pain on the right side of the head. He felt bad generally and vomited several times soon after beginning of the pain. There were also some convulsive movements and weakness of the lower extremity. No vomiting. Sensorium clear. Fundus of both eyes normal. No earache but a discharge of foul pus from the right ear. No mastoid tenderness. Pulse 64 and regular. Temperature 37° C.

The radical mastoid operation was undertaken soon after the patient was admitted to the hospital. The mastoid bone was sclerosed and contained a very small antrum which was filled with a cholesteatomatous mass. The dura of the middle cranial fossa was exposed and several exploratory punctures made into the temporal lobe in different directions without finding pus.

Following the operation the patient apparently improved, the pain leaving him for four days, the appetite returning, and the general appearance of the patient improving. The temperature however remained below 37° C. while the pulse

rose to 78 and remained irregular. On the fourth day after the operation, some œdema of right upper eyelid was noticed, and two days later the pains in the right side returned. The patient grew weaker and listless. Pulse 60 but regular. The pain continued to increase in severity and on the following two days the patient vomited frequently, the pulse rising from 68 to 72 and becoming irregular. The patient still complained of no dizziness but of much weakness of the lower extremity. He had a staggering gait. Vomiting became more frequent, and when examined six days after the radical operation a marked optic neuritis and swelling of the optic disk were present. The old wound was reopened, the incision extended posteriorly, and the cerebellum and the lateral sinus exposed. The dura seemed to be in a normal condition. The sinus wall, although apparently thick, was not distended. It was not pulsating. Upon incising the sinus it was found to be filled with a large thrombus. Incision of the cerebellum liberated two tablespoonfuls of thick, foul pus. By using the finger, inserted into the abscess cavity, as a guide, a counter opening was made posteriorly to the sinus. The cavity was tamponed. After this operation the patient was again considerably improved, the headache disappearing, and the pulse becoming more rapid although remaining irregular. Constipation was still marked. The tampon was removed for the first time on the fifth day after the operation. Ten days later the abscess cavity had closed, the appetite had returned, the bowels moved daily, and the general condition was good. The pulse was still subject to variation, varying at different times from 64 to 92. The temperature was 36.9° C.

About four weeks after the last operation, the optic neuritis on the right side had disappeared but the edges of the disk were still somewhat blurred. Optic neuritis was still present on the left side. When the patient was discharged some time after this he was able to walk naturally without any difficulty. His pulse was 80, but still lost one beat every one and a half to two minutes.

The feature of this case was the apparent improvement following the first operation, which was probably the result of

opening the cranial fossa. Real improvement did not follow until after the second operation, made six days after the first exploration. After the second operation, the pulse rose from 60 to 78, and the patient expressed himself as feeling perfectly well, with the exception of the persistent constipation. The brief period of apparent improvement noticed after the first operation was followed by more severe headache, frequent vomiting, tottering gait, slowing of the pulse, and the appearance of a double optic neuritis. The temperature continued slightly elevated after the first operation. This symptom-complex indicated cerebellar involvement and the necessity of another operation. The only symptom denoting sinus thrombosis was the transitory swelling of the right upper lid. The optic neuritis was indicative of either of the two existing conditions.

ABSCESS OF THE TEMPORAL LOBE.

By Dr. ALBERT BLAU, Goerlitz.

A boy of eighteen, with a history of otorrhœa on the right side during childhood, applied for treatment on account of a foul discharge from the right ear. Examination revealed a large perforation in the right drum, occupying the lower half of its area. The malleus had lost its long process and felt rough on contact with a probe. The mucous membrane of the tympanic cavity was covered with granulation tissue. This was removed with a curette and the operation followed up by consistent irrigation and cauterization. As this treatment was of no avail and the granulation tissue continued to increase, the radical mastoid operation was advised but refused. In the course of a year the tympanum was curetted a second time, and later, about eleven months after the beginning of the treatment, the ossicles were removed. Notwithstanding all this the condition remained unimproved.

About a year after the patient began treatment, the radical operation was finally consented to. The antrum was found full of pus and granulation tissue and its bony walls as well as the tegmen were carious and soft. The carious tissue was

removed, thereby exposing the dura, which was apparently normal and showed no pulsation. As the carious bone extended backward, its removal also laid bare the sinus, which appeared normal. The operation was completed with Koerner's plastic.

The healing process took a normal course until the fifth day, when the patient began to complain of a feeling of pressure and pain in the right temple and eye and the right eye began to secrete tears freely. These symptoms became worse and by the next day there was considerable photophobia. The right pupil was slightly dilated. The fundi were normal. Temperature 37.6° C. Pulse 66 to 78.

Three days later the patient began to vomit, and the first symptoms of an affected sensorium showed themselves. Although the patient answered questions rationally, his mind seemed sluggish and his speech slow. On that same evening he suddenly became very restless and in half an hour lost consciousness. Both pupils were dilated, muscular twitching was noticed on the left side, and the pulse had increased from 140-160. The patient was given an enema, which was effectual. Soon afterwards he recovered consciousness, and the pupillary reaction to light returned, although the right pupil still remained somewhat wider than the left. Pulse 90. The sudden change for the worse and the subsequent improvement all took place within three and a half hours. On the following morning the general condition of the patient was apparently much improved. He had no headache and very little lachrymation. However, the tendon reflexes, especially the patellar reflex, were very much exaggerated, and the pulse was unusually slow, ranging from 58 to 66. Temperature 36.9° to 37.3° C.

More bone was removed and an area of dura about the size of a dime exposed. The dura was hyperæmic but non-pulsating. After this the wound was dressed daily.

The hyperæmia of the dura continued to increase until two weeks after the operation it had become tense and very much discolored. The patient at that time again complained severely of headache and lachrymation on the right side. The dura was freely incised and three tablespoonfuls of

yellowish-green pus liberated. The pulse, which before this operation had been 57, rose to 72 during the operation and the headache and lachrymation ceased. Temperature 36.7° to 37° C. The wound was dressed again on the afternoon of the same day and about two more tablespoonfuls of pus evacuated. The brain substance surrounding the deep pus cavity was soft and discolored. Pus continued to discharge freely for several days after opening of the abscess.

A month later it was still discharging slightly; the pulse ranged from 90 to 100; temperature 37.3° C. The wound was again extended backward and sufficient bone removed to expose an area of dura as large as a half dollar. The dura was split as far as the edge of the bone. This large opening allowed the softened brain substance gradually to exfoliate. The pus discharge subsided and the wound began to granulate. Two months later the wound had closed and the patient was apparently in perfect health.

The manifest stage of brain abscess in this case was characterized by headache, supraorbital neuralgia, lachrymation, dilated pupils, vomiting, lethargy, and later by loss of consciousness, wide rigid pupils, twitching of the muscles of the face and left leg, increased patellar reflex, and slow pulse. Before the manifest stage the only symptoms to indicate brain involvement were the depressed condition of the patient and his general unhealthy appearance, although the carious condition of the tegmen and the absence of pulsation and lustreless condition of the dura were suggestive of dural inflammation.

The brain infection and subsequent abscess formation in the temporal lobe in this case in all probability took place through the tegmen where the bone was carious to the dura. The dura at first showed no evidence of brain abscess, but later bulged as though about to rupture. Its marked thickness was suggestive of an inflammatory condition of long standing. It is difficult to conceive of the infection extending through the dura without breaking down of the membrane, and the only satisfactory explanation of the infection is an extension by means of the lymphatics and blood-vessels.

REPORT OF THE FOURTEENTH ANNUAL MEETING OF THE GERMAN OTOLOGICAL SOCIETY IN HAMBURG, JUNE 9 AND 10, 1905.

By DR. VON GAESSLER, ERLANGEN.

Translated by Dr. ARNOLD KNAPP.

The presiding officer, Dr. KRETSCHMANN, welcomed the assembly and spoke of the five members who had died during the past year. The Secretary reported that the Society now numbered 337 members. The publication of a second number of *The Anatomy of Deafmutism* was announced. It consisted of a monograph by Dr. Alexander of Vienna, with forty-five illustrations on nine plates. The next annual meeting will be held in Vienna, and Dr. Hartmann of Berlin will be the presiding officer.

I. Dr. HARTMANN (Berlin). **The hard of hearing in the schools.**

Owing to the better care which is now being taken in Germany of the deaf-mutes by special deaf instruction, a constantly growing number of deaf-mutes can undertake certain callings. While in Prussia in the year 1880 only 43.6 per cent. of the adult deaf-mutes were active in a profession, the number had increased to 70.2 per cent in 1900. These figures show the social as well as the economic importance of the instruction of deaf-mutes. This has obtained a distinct and new importance on account of the investigations of Bezold, who has shown that many deaf-mutes retain hearing remnants and can thus be instructed by a special form of instruction in order to learn and make use of speech. In a similar position to the deaf-mute is the very deaf. The greater the deafness, the more is the mental development re-

tarded, and consequently the poorer is the social position of the deaf person. Experience has shown that very deaf children remain for years in the lowest classes, or they are finally transported to the classes for the weak-minded as they are regarded as such.

The number of ear patients among school children has been demonstrated by systematic examination of the schools, and it has been shown that in one quarter of the children in the schools the hearing organ is not normal. The relation of the various causes for deafness is not the same according to all investigators. In general, Eustachian-tube infections constitute 50 per cent. Moreover, according to Bezold, 1 per cent. of the children possess suppurating ears and the same proportion possess dry perforations. These experiences gained from the examination of the school children have also been demonstrated in the examinations for military service. In Prussia in the year 1903, 10.7 per thousand could not be admitted to military service on account of an ear trouble. Of great importance is the fact that in very many deaf children the deafness varies greatly, which is generally the case with stenosis of the tubes in conjunction with diseases of the naso-pharynx. This condition may produce a suspicion of simulation on the part of the child and thus lead to incorrect judgment.

The hearing examinations are now made, according to Bezold's suggestion, entirely with the whisper voice, in which only the residual ear is used and the numbers from 1 to 99 are spoken. The ear not examined is turned away from the examiner and closed with the index finger. To determine to what degree of deafness the children in the schools belong, or whether they cannot be admitted to the ordinary classes, the grades of deafness have been classified according to Bezold and Denker. They found that 75 per cent. of the ears examined heard whisper in more than 8 metres, 8.9 per cent. in less than 4 metres, 5 per cent. in less than 2 metres, 3.5 per cent. in less than 1, and 2.2 per cent. in less than $\frac{1}{2}$. Very frequently deaf children are regarded as weak-minded. For instance, the teacher in a class for deaf children considered 4 as weak-minded among the 12 deaf children. These upon proper instruction were shown to possess perfectly normal mental development. A series of examinations of hearing which were made in classes for weak-minded children showed that among these there was a large

proportion of more or less deaf ones who improved very much after their deafness had been recognized and proper instruction had been instituted.

As the number of deaf among 100 school children has proved to be between 4 and 5 who can hear a whisper voice only at a distance of 2 metres, and can therefore not follow the instruction, it is necessary that a school physician should act in conjunction with the teacher, and examine the hearing power of all children. Special regard should be paid to whether the cause of the deafness can be cured, and proper means should be undertaken that the condition may be treated. The experience of all investigators has shown that an appropriate treatment in 50 per cent. of the deaf children has cured or very much improved the trouble. It is the duty of communities that the deaf should receive proper treatment. Of those children who are incurably deaf, their remaining in the schools depends upon whether they can follow the instruction. In addition to the absolute degree of the deafness, the intelligence of the child and the supplementary aid on the part of the teacher from the parents play an important rôle. Association with normal children is of great importance for deaf children. Bezold demands a hearing power of 2 metres for the whisper voice for those desiring to visit a school, though the instruction may be undertaken even in those with poorer hearing.

In Berlin, among 23,000 school children, 45 deaf children were selected. Of these, 30 were divided into three classes for deaf children. These were instructed by three teachers in two departments. The inmates were principally children who could hear a whisper voice in less than half a metre. The better hearing ones remained in the public schools. The establishment of separate classes for deaf children is to be recommended in cities of 150,000 to 200,000 inhabitants. The main point in the instruction consists in the cultivation of speech and the understanding for speech. In lip reading and in general, the plan of the public schools is the one which is to be followed. Even children who have good hearing remnants and have not been able to learn speech can be admitted to these classes.

In the higher grades of deafness where whisper cannot be heard and conversational speech is only heard in the neighborhood of the ear, the instruction is that for deaf-mutes with hearing remnants.

Conclusions.

1. The deaf children are to be determined by hearing examination of all the children. This examination may be conducted by the teacher if he has been properly instructed.

2. It is desirable that the deaf children should be examined by a competent physician and if possible the deafness should be treated.

3. Selection of a seat in the neighborhood of the teacher.

4. The better hearing ear should be directed to the teacher.

5. Special attention must be paid to whether the deaf child is following the instruction.

6. Mistakes due to imperfect hearing should be properly recognized.

7. Each deaf child should be seated with a wide-awake intelligent scholar who can supplement the instruction.

8. The other children and the parents should be asked to talk as much as possible with the deaf, and endeavor to make them join as much as possible in the conversation,

9. If the work in the school is difficult, help should be furnished by additional hours.

10. In high grades of deafness where a whisper voice can only be heard in a distance of from 1 to $\frac{1}{2}m$ or less, individual instruction should be practised, or special classes for deaf children should be formed, which should contain from ten to fifteen children.

11. If the very deaf children cannot be individually instructed or receive instruction in classes for the deaf, they should be admitted to the school for deaf-mutes. This institution should be formed after the pattern of that in Munich.

2. **Dr. PASSOW. On school instruction for deaf-mutes.**

The speaker had been requested by the Prussian Government to report on the results of the hearing instruction of deaf-mutes. The instruction of deaf-mutes from the ear has been quite successful. This is shown by the literature of the deaf-mute teachers and witnessed by all those who have been interested in this subject. The instruction, however, is probably given only in Munich and in Heidelberg. In general, children who were instructed in classes with the usual methods of instructing deaf-mutes received separate instruction from the ear in additional hours. A thorough reform is here required. The formation of

hearing classes in the various deaf-mute institutions is associated with difficulties, because scholars of various ages and degrees of intellect must be grouped together, but a separation of the partially-hearing from the totally-deaf must be carried out. Special institutions should be formed to admit the partially-hearing, in which they will be instructed in speech from the ear. The chief difficulty consists in the selection of proper scholars. In addition to these schools, the old deaf-mute academies can continue, but should receive only the totally-deaf. In this separation of the totally deaf, the gesticulation can be controlled and a uniform method of speaking should result. The true deaf-mute cannot obtain any practical advantage from speech which is uncomfortable for him and which is difficult for those surrounding him to understand. He therefore prefers to use the sign speech. These persons only associate with one another by means of this form of speech. Hence in the totally-deaf the sign language cannot be given up but should be cultivated. It is desirable that in all institutions a similar and uniform sign language should be introduced, and it is desirable that every deaf-mute teacher should understand it thoroughly. Finally, it would be well to introduce obligatory school attendance for deaf-mutes.

Discussion.—Dr. DENKER stated that from his own experience he was in favor of getting the aid of the teacher in making the examinations of school children. If they have been previously thoroughly instructed their examinations are sufficiently reliable.

KÜMMEL is in favor of proper schools for deaf-mutes, with instruction in the sign language, in which the children may remain for one year. After that they should be separated according to their hearing power and their mental equipment. Those who cannot be instructed by the ear should depend upon the sign language, also those who are very weak mentally. The more intelligent children should later learn speech.

WANNER objects to the form of hearing instruction, and suggests instruction from the ear. The establishment of special institutions for the partially-hearing would be very desirable. In Munich, out of 500,000 inhabitants, there are 52,000 school children, for whom the School Commission has appointed ten aurists. One of these determines the extremely-deaf, and ten to fifteen classes are necessary for these.

LAUBI suggests that a commission be appointed in order to institute uniform school examinations.

KÖHLING, a teacher of deaf-mutes, reported on the establishment of a hearing class in Weissenfels. He is opposed to the idea of the greater importance of the sign language and regards it as a step backwards.

GUTZMANN is of this opinion, and knows totally deaf persons who have retained the power of speaking after their school days and can make themselves understood very well.

BRUEHL also spoke of deaf-mutes who in later life could make use of the speech which they had learned in school.

HARTMANN, in conclusion, again wishes to distinguish between classes for deaf children and classes for deaf-mutes with hearing remnants. He is also in favor that a commission be appointed.

PASSOW replied that he had only recommended that the question of the instruction of deaf-mutes should be examined more closely. He is not at all of the opinion that the sign language should take the place of speech. On the contrary, the sign language should go together with the instruction by speech.

3. Dr. DENKER. Which elements can we neglect in learning the human speech?

Clinical observations have shown that, in order to learn to speak, the entire complicated apparatus of the human ear is not necessary. The auricle can be missing, the ear canal can be occluded, the drum, hammer, and anvil, and even the inner muscles of the ear may be destroyed if the stapedial plate is preserved and can vibrate. In regard to the inner ear, we may conclude from the examination of deaf-mutes that the terminal distribution of the vestibular and ampullary nerves has only a secondary importance for hearing. To the other question, as to the elements in the complicated terminal apparatus of the cochlear nerve, which corresponds to the highly developed Corti's organ of man and of the mammals, a satisfactory answer cannot at present be given from our present knowledge of the histological examination of the normal and pathological temporal bone of man. We may, however, draw certain deductions from comparative anatomy. We possess in the parrot an animal of whom we are certain that it understands the human speech, because it can repeat it, and whose hearing organ is placed upon a lower scale than the mammalian ear. The ear of the parrot has been examined by wax and metallic corrosion models in various series, and a large wax model has been made by Dr. Gaessler. These

ears belong to animals who could at least pronounce several words. These results show certain points of similarity with conditions found in the human ear :

1. In place of the ossicular chain of man, there is a bony pillar, the columella, which protects the drum membrane externally and is attached with a foot-plate in the vestibular window.
2. There are no intratympanic muscles which approach the columella.
3. The length of the papilla basilaris is in man, according to Retzius, 33.5mm, in parrots about 2.2mm.
4. The entire complicated supporting apparatus and Corti's organ of man are absent in the parrot. There exist, just as in other birds, the corn cells which are situated next to the basilar membrane and the hearing cells directly underneath the membrana tectoria which contains the hearing hairs which project into the latter.

By means of the projection apparatus, photographs of the wax corrosion specimens of the labyrinth of the parrot were demonstrated, and a large number of microscopic sections were shown to illustrate the structure of the parrot ear, the various terminal nerve areas, and the otoliths.

4. Dr. DENNERT (Berlin). **Acoustic and physiological experiments on the ear.**

The experiments of Dennert have shown that sound is transmitted to the labyrinth fluid in any one of three ways, the sound-conducting apparatus, promontory, and cochlear window, especially by the first. It is of great importance that membranes in general, and especially animal membranes, are not only excited by their own tone, but by one of their overtones and by every sound either simple or complicated in a medium containing air or in one containing fluid. The excitation is also transmitted to bodies which are connected with them in a closely connected system. This peculiarity of membranes in general, especially of the drum membrane, is suited to transmit sound-waves to the ossicular chain, and by this to the labyrinth fluid. Another favorable circumstance is furnished by the fact that the drum membrane is situated between two media which are similar and of the same nature as the medium which contains the exciting source of sound. In regard to the transmission of sound by mass vibrations or by molecular processes, a final decision cannot at present be given.

Sound is analyzed, according to Helmholtz and to the unanimous opinion of physiologists and otologists, in the membrana basilaris and its adnexa. It is possible here also to prove that from its configuration the supposition of its function is in accord with experimental acoustic observations.

Conclusions.

1. The theory of Helmholtz explains, as far as it depends upon the resonance theory, in a simple and natural way the main features during the act of hearing.

2. Sound proceeds by each of three ways, the tympanic mechanism, bone, especially of the promontory, and the round window to the labyrinth fluid. The tympanic mechanism is developed to the highest degree by nature, so that it is of great importance in the transmission of sound.

3. The membranes in the auditory organ play an important part in hearing—first, in regard to the transmission of sound from air to the inner ear by the connection of the drum membrane with the ossicular chain, and serve for the analysis of the sound by the connection of the basilar membrane with its adnexa.

4. The extraordinary correspondence of the anatomic conditions in the ear and the processes during hearing to the experimental acoustic observations cannot be disregarded.

5. **Dr. KRETSCHMANN. On the associated vibrations of solid and fluid bodies.**

To understand the transmission of sound-waves to the labyrinth it is necessary to understand the reaction to sound-impulses of air contained in closed cavities, as in bone, *i. e.*, a solid body, or in the contents of the labyrinth, *i. e.*, a fluid. If we approach a vibrating tuning-fork to a rod of wood, metal, or glass, so that the prongs of the fork are situated parallel to the rod, the tone is increased. In this case there need not be a reflection of sound. If several pieces of wood be attached to a plate, the tone becomes increased if the tuning-fork be approached parallel to the long diameter. It does not increase in intensity if it is approached transversely across the middle of the piece of wood. If the ends of the fork be brought nearer, the tone is again increased, which reaches its maximum when the prongs of the fork are brought next to the heads of the wood. The same con-

dition is seen in living bone, which can be demonstrated in the simplest manner with the flat hand. If the vibrating tuning-fork is approached parallel to the direction of the phalanges, the tone is increased; if it is approached transversely to the direction of the phalanges, there is no increment of sound near the *vola manus*, but the sound is increased when the fork is approached to the articulation of the hand or to the tips of the fingers.

In the experiments quoted, solid bodies were caused to vibrate and to produce a sound.

We may expect that the flat cranial bones can be caused to co-vibrate by deep and middle tones which can be shown by an experiment. Cartilage acts similarly to bone; in fact it seems to react to a weaker impulse than bone. Homogeneous plates act just as the united pieces of wood. The sound is first increased when the vibrating tuning-fork is approached to the margin of the plate. If the plate has more or less the relation of the stapes plate, we find that in the case of most tuning-forks the place of the strongest sound production is the region near the short side in the median line and another point in the middle of the plate. It seems, therefore, evident that the stapelial plate is caused to vibrate by two branches which are inserted at the most favorable acoustic points. The fluid bodies react similarly to the solid bodies. If a vibrating tuning-fork is brought near to a rubber bag filled with water, the same conditions result as with the piece of wood. Of importance for the intensity of the increment of sound is the size of the mass of water, as bodies of small dimensions increase the tone more than those of large dimensions. The manner in which sound-waves are transmitted through the vestibular window is explained by the experiment. We can also demonstrate that the labyrinth fluid will be excited by sound-waves passing through the cochlear window and the bone of the labyrinth wall. The relation of air closed in solid cavities will not be discussed here. These facts must be carried in mind in all experiments to explain the hearing.

Discussion.—VOHSEN: The experiments of Kretschmann can be explained in a simple manner. The increase of the tone intensity results from the larger masses being set in motion. The increase in the intensity of the tone is lost in the duration of the vibration according to the law of the preservation of energy.

DENNERT: Kretschmann's experiments can be explained by reflection of sound and diffusion of sound. Sound is transmitted

to every body. The important fact, however, for the resonance theory and for otology is that a body is excited in its own period of vibration by sound. Only in this case does this body reply with its own period of vibration, and it is possible for this first body to transmit the excitation to a second body with which it is connected in a close system. The latter replies in its own period of vibration, if it possesses the same period of vibration as the first body; otherwise it does not reply. If this is applied to the ear, in one case the ear answers with an auditory impression, in another case it does not. The ear has probably developed by the gradual growth of elements of a distinct period of vibration from the simplest forms to its present complicated condition.

6. Dr. SCHOENEMANN (Berne). **Are there relations between the form of the temporal bone and the configuration of the tympanum?**

Two hundred and fifty skulls of the greatest variations were measured.

A distinction is made between pyramids with a flat roof and pyramids with a pointed roof. If the pyramid has a flat roof, the base of the skull is also flat, while in the pyramids with pointed roofs the bases of the skulls are distinctly uneven and the clivus steep.

The angle which the squamo-mastoid fissure makes with the horizontal diameter of the skull is in relation to the configuration of the roof of the pyramid, and is greater in pyramids with the flat roof than in those with the pointed roof. In cases in which this fissure is no longer entirely preserved, a line can be constructed in the long axis of the mastoid process, which forms the mastoid angle with the horizontal diameter of the skull. In pyramids with flat roofs the mastoid angle is large; in pyramids with pointed roofs it is small. Moreover, in the former the level of the pyramid apex is depressed in relation to the base; in the latter it is elevated. The form of the transverse section of the bony canal and, consequently, the position of the auricle show a relation to the configuration of the roof of the pyramid.

While the angle of declination and inclination of the drum membrane does not depend upon the form of the roof of the pyramid, the entire configuration of the drum membrane is influenced in that in pyramids with a pointed roof a wedge-shaped apex with sharp upper angle is present, while in pyramids with a flat roof it lies perfectly flat. Finally, in pyramids with pointed

roofs the sinus is nearer to the posterior wall of the external auditory canal than in the case of pyramids with flat roofs.

SCHOENEMANN illustrated his paper with numerous photographs, specimens, and tables.

7. Dr. ALBRECHT (Heidelberg). The prognosis of early cases of acute middle-ear inflammation.

Previous statistics have furnished a too unfavorable picture of the prognosis of middle-ear suppurations because they have represented generally the clinical material in specially severe cases. We receive a more correct picture of the true relation of the severe and the mild cases if we only compare the cases which come to treatment in the first three days of the disease. In these cases the genuine otitides give the most favorable prognosis. In these complete restoration with normal function is the rule. Complications occur in 2.85 %. This includes the possibility of a fatal issue, which is, however, very rare and in 175 cases occurred in only one.

The secondary cases of otitis are to be separated from the general cases. They lead more frequently, and as a rule, to spontaneous perforation of the drum. Their duration is longer and they are often complicated, and both in regard to mortality and a tendency to pass into the chronic stage they furnish a much poorer prognosis. The progress is the more unfavorable the more severe the general disease. The cases which perforated spontaneously in the first days ran a more unfavorable course than those which perforated late. It is striking that the cases in which a paracentesis was performed ran a less favorable course than those in which paracentesis occurred spontaneously. The age is also of importance in the duration of the disease. Nurslings generally present a very long period of disease.

8. Dr. SCHEIBE (Munich). Statistics and treatment of acute otitis media.

Our previous statistics on this point are based on material which varies too greatly to permit deductions. The best results can only be obtained when one and the same observer treats for a certain length of time half of his cases by one method and half by the other. The statistics of Koerner on the value of paracentesis are not convincing because dissimilar cases were compared. The speaker's statistics are not suited to answer these questions because paracentesis was only performed in the most severe cases.

Another method to obtain serviceable statistics is for every author to use only his own early cases, and distinguish his general cases from his secondary ones, and regard the age and condition of life of his patients.

The discussion on the subject is postponed until next year.

9. Dr. BLOCH (Freiburg). **A new and reliable method of testing the hearing.**

The new apparatus, which was demonstrated, consists of two thin plates attached to the prongs of a tuning-fork. The plate directed to the examiner carries a narrow slit through which a triangle can be observed exactly in the middle line in the posterior plate. During the vibrations of the tuning-fork on both sides of the triangle, a long white band is observed which becomes steadily smaller as the fork dies out. Two marks in the middle line of the triangle show the amplitude in millimetres.

The advantages are the following:

1. A maximal impulse is not necessary. The determination can be made from an amplitude which is small, and which approaches more the hearing threshold value of the ear to be examined.

2. The ear of the examiner is not used as a control if the hearing duration has been previously determined in the case of a number of normal-hearing persons.

3. This procedure is suited for determining the hearing in the important small and large octaves.

4. The procedure is equally well suited to determine air-conduction as bone-conduction.

This new apparatus is the invention of Dr. von Kittlitz.

10. Dr. POLITZER (Vienna). **Changes in the labyrinth in chronic purulent otitis.**

Twenty-one temporal bones were examined histologically. A series of ten to eleven cases is reported upon with numerous illustrations and microscopic specimens. These show various changes in the labyrinth windows, the vestibule, the semicircular canal, and the cochlea. Frequently in cases of perforation of the suppurative from the cochlea into the internal auditory canal, the peripheric part of the auditory nerve was infiltrated with pus, and in a number of cases divided by a demarcation line from the central part. In almost half the cases meningitis was the cause of death.

The demonstrated cases show how frequently these changes

occur in chronic purulent otitis, and it may be assumed that affections of the labyrinth occur very much more frequently than has been formerly supposed. The author possesses a number of specimens showing changes of the labyrinth with intact windows.

The diagnosis of suppuration of the labyrinth can be made in a number of cases where pronounced clinical symptoms are observed. The Weber experiment is unreliable. Of special importance is Schwabach's experiment which in most cases shows a diminution.

In regard to treatment, the previous methods of operating have not given satisfactory results. If we consider that these cases are usually very slowly progressing destructive processes which extend deep into the internal auditory canal, we should attempt to reach these organs by operation. This is possible by a method of operating proposed by Dr. Neumann, an assistant in Politzer's clinic, by which it is possible to advance to the internal meatus without injury to the facial nerve. The method of operating was demonstrated on a specimen. Six cases have thus far been cured by this method.

Dr. PANSE presented specimens and drawings which showed the importance of the tympanic window as the site of entrance for the suppuration.

The discussion is postponed to the meeting of the following year, when the subject of labyrinth suppurations will be one of the principal topics.

WANNER begs that the examination with tuning-forks in these cases will not be forgotten.

II. Dr. MANASSE (Strassburg). On labyrinthine chronic progressive deafness.

Twenty-nine temporal bones with chronic progressive deafness belonging to eight individuals were examined. Three of these, of two individuals, showed the typical refraction with stapes ankylosis. Two others of two individuals showed an ankylosis of the stapes by connective-tissue new-formation. In the other twenty-four cases there were changes in the labyrinth and in the auditory nerve. The latter belonged to cases between twenty-six and eighty years of age. As far as they had been examined with the tuning-forks, they presented, especially in advanced cases, the signs of labyrinth deafness. On microscopic examination, seventeen cases showed decided changes of the labyrinth, seven signs of old inflammation of the middle ear.

The changes in the sound-perceiving apparatus were:

1. In the ductus cochlearis.
2. In the ganglion spirale.
3. In the fine nervous channel of the modiolus and of the tractus foraminulentus.
4. In the trunk of the auditory nerve.

In general the changes were those of atrophy and connective-tissue formations. The origin of the disease cannot be explained. Striking is the great resemblance of these pictures to the conditions found in congenital and acquired deafmutism.

The subject is illustrated with drawings.

Dr. BRUEHL demonstrated microscopic specimens of the cochlea of a patient forty-four years of age, who lost his hearing in the course of tabes. Corti's organ and the termination of the vestibular nerve did not show any marked changes. The spiral ganglion and the trunk of the auditory nerve presented marked changes, which could be followed into the medulla oblongata. According to the grade of the anatomic changes, it can be assumed that the process of degeneration started from the spiral ganglion.

Discussion.—SCHWABACH mentioned that in his case no changes were found present in the trunk of the auditory nerve; moreover, there was no inflammatory change in the cochlea. He assumed, therefore, the presence of disturbances of development. At present he had a case of apparently congenital deafmutism, which answered to the picture just described by Manasse.

12. Dr. BLAU (Görlitz). **On experimental closure of the round window.**

The round window in dogs and cats was closed with cement, or with Fletcher's mass. The animals which had been operated on on one side walked in a crooked manner, inclining their bodies to the operated side. The head was held at the operated side, and in walking described a circle in the direction of the operated side. These symptoms slowly disappeared in from two to three months.

In the animals which had been operated on on both sides there was, after the closure on one side, the same disturbance of locomotion. The animals were afraid, and were not able to jump. In attempting to jump, the operated side was advanced, they described a slight arc in this direction, and then came to a fall toward this side. If the other side was also operated on, these

symptoms disappeared in a short time, the animals walked in a straight direction, and jumped correctly.

The animals which were operated on on both sides did not react at all to hearing tests. The animals which had been operated on on one side only reacted to all impressions of sound. If the side which had not been operated on was occluded as carefully as possible, the reaction was an unusually slow one.

In addition, the examination on the rotating disk showed the appearance of vertigo in the corresponding direction with nystagmus.

Autopsy performed after from two to five weeks showed that the cement had remained firm and that the round window had been completely closed. The histological examination has not as yet been finished. Inflammatory changes have been found in the membrana tympani and in the neighborhood of the round window. Unusual changes in the cochlea have not been observed. An additional report will follow.

13. Dr. HEINE (Berlin). On the treatment of acute purulent otitis media, with congestive hyperæmia, after Bier.

According to the procedure of Bier, experiments were made with congestive hyperæmia at Lucae's clinic. The method of Bier was carefully followed. On the whole, the congestion was well borne. The favorable influence on the pain was not so marked as was to have been imagined from Bier's report—in fact, in some cases the pain was increased.

Nineteen cases were treated with congestion. Of these, 4 were bilateral; 23 cases of otitis and 2 cases of acute otitis media without perforation, 3 with perforation but without mastoiditis, 6 of otitis with tenderness of the mastoid process but without swelling, 5 with infiltration of the soft parts, 3 with subperiosteal abscesses. Of the 23 cases of otitis, 8 were operated upon, 9 were healed, in 2 the mastoiditis is apparently improved. In these and in 4 other cases the treatment is not complete.

The cases with abscesses gave a good result. Of these, two were cured and one is still under treatment. It is, however, to be noted that a simple incision permitted an escape of pus. A very favorable result was observed in one case of Bezold's mastoiditis, where the symptoms of the mastoid process disappeared under the congestion, and it presented then a scanty mucopurulent discharge. In general, according to previous experience, the cases of mastoiditis with infiltration of the soft parts,

or with the formation of an abscess, seem to be most suited for this method. It is, however, not altogether without danger, because by masking the picture the right moment for operation may be missed.

Discussion.—The PRESIDENT does not consider that we can expect great results from these extended theoretic descriptions.

VOHSEN warns against the use of Bier's procedure in acute inflammations. It is, however, different if there is free discharge of pus.

ESCHWEILER remarks that the technique is not so simple as it appears, and that it should not be treated schematically. His own experiences with congestions are very favorable. However, his material was principally composed of cases of mastoiditis with formation of abscesses. The abscesses were opened with a small incision; the middle ear was not further treated. Eschweiler observed favorable results in Bezold's mastoiditis, and thinks that a distinction should be made between a collection of pus in the connective-tissue spaces and one in a preformed cavity lined with mucous membrane. He cannot agree to the theoretic objection of Vohsen.

HINSBERG was not able to observe any favorable results in his cases.

KOBRACK reported that in Brieger's clinic the congestion was practised by the aid of Henle's congestive bandage in a number of chronic affections of the ear and nose, and no favorable result was observed.

14. Dr. HENRICI (Rostock). Further experiences in primary bone tuberculosis of the mastoid process in children.

The author has previously reported upon eight cases of tuberculosis in the mastoid processes of children, and has collected the results of his examination. He is now able to add the histories of three further cases of children under seven, and two cases of children in the eighth year. The combined statistics show that primary tuberculosis of the mastoid process occurs in somewhat less than one sixth of the cases of mastoiditis of childhood. It is, therefore, very much more frequent than is generally allowed. This form has especial interest, on account of its character as primary bone tuberculosis, and not a disease transmitted from bone tuberculosis of the tympanum.

Three cases are reported in which there was a tuberculosis of the mastoid process, while clinically the tuberculous disease of

the tympanum could be excluded with certainty, and the upper respiratory passages were free from any tuberculous focus. The unusual amount of diploë found in the juvenile mastoid process plays apparently a predisposing rôle. The tuberculous nature is only to be recognized macroscopically in a few of the cases. The histological examination shows the true condition. The period of recovery is somewhat prolonged as compared with the usual cases of mastoiditis, though in most cases the simple mastoid operation leads to recovery. The possibility of a spontaneous recovery is given. The prognosis is more unfavorable the younger the child. The tuberculosis extending to the mastoid process from the tympanum is very much rarer in children than the primary form.

Discussion.—KOBRAK reports a case in which isolated tuberculosis of the mastoid process appeared to be present in a child. The operative wound healed kindly. The child subsequently died from an intercurrent disease, and an extensive old tuberculosis of the tympanic mucous membrane was found present.

15. DR. G. ALEXANDER (Vienna). **On the clinic and anatomy of the ear in diseases of the vascular system.** (With demonstrations of specimens and pictures.)

The examination of cases of deafness in arterio-sclerosis showed degenerative changes of the same type as those which have been just mentioned by Manasse.

A condition is described as occurring in fifteen cases of lymphomatosis. In one case of apoplectiform Ménière's disease, with sudden deafness in the course of acute leukæmia, degeneration of the auditory nerve was shown by Marchi's method, which had extended to the right nuclei but not in a central direction beyond these, so that the posterior quadrigeminal bodies were normal. In the peripheric part of the auditory organ there were hemorrhages, lymphatic infiltrations, inflammatory processes, and degenerative changes of various parts.

A case of chloroma is reported. In addition to old hemorrhages in the vestibule, a hemorrhage was found in the aqueduct of the vestibule, which had led to a change of shape in the vestibule and in the membranous canal of the cochlea.

16. DR. G. ALEXANDER (Vienna). **Demonstration of histological specimens of cases of congenital deafness.** (This is contained in the second volume of the *Anatomy of Deafmutism*.)

17. Dr. LINDT (Bern). Demonstration of microscopic specimens of a case of congenital deafmutism.

The changes occupied the inferior part of the labyrinth, of the cochlea, and the saccule. The saccule showed ectasia and the formation of folds. The epithelium of the macula sacculi was degenerated. Further, there was an aplasia of Corti's organ in all its turns, hypoplasia of the membrane of Corti, degeneration of the epithelium of the stria and of the stria vascularis in general, and collapse of Reissner's membrane. There was an atrophy of the spiral ganglion in the basal turn, less marked in the other turns. The nerve fibres of the cochlear nerve are atrophic and show a peculiar degeneration which has thus far not been sufficiently accentuated in deafmutism. This degeneration is especially pronounced in the tractus foraminulentus. On the other hand, the nerve fibres of the vestibular nerve are normal. This condition can, therefore, not be explained at the present moment.

18. Dr. HOFFMANN (Dresden). On a case of otitis pyæmia.

A case of bilateral genuine otitis is reported, in which at the end of three weeks the left and then the right mastoid process were operated upon. The diplococcus lanceolatus was found in pure culture in the pus. The suppuration extended from the left ear to the meninges, with the formation of a purulent meningitis and hemorrhages in the meninges. Invasion of the blood passages with the infectious agents either from the wound surfaces or by way of the lymph passages led to metastases, pulmonary abscess, purulent fibrous pericarditis, and left-sided pleurisy. As the sigmoid sinus and the bulb of the jugular vein on both sides showed smooth walls and no thrombus, the disease is regarded by the author as pyæmia through bacteriæmia. The small thrombi found at the autopsy in the lung and in the transverse sinus are regarded as compression thrombi from hemorrhages in the surrounding tissues. It cannot be determined whether the pulmonary abscess originated from these thrombi. The pus in the pericardium contained the diplococcus lanceolatus.

19. Dr. PANSE (Dresden). The clinical examination of the sense of equilibrium.

Vertigo is a deception as regards our position in space. The vertical rotation follows in the plane of a large part of the horizontal semicircular canal. Irritation of the lateral ampullæ causes

a subcortical impression to arise as if the visual field was rotated in a horizontal direction towards the diseased side. The eyes follow this direction slowly and return with a quick motion to the original position. The sensation is that of a movement of the body towards the healthy side. If the irritation is sufficiently marked the body will be thrown in this direction. The correcting movements work in the opposite direction. The relations for the other nerve areas of the static apparatus are in the same relative condition. It is therefore desirable in expressing a disturbance of equilibrium that it be stated in what direction the more rapid movements of the nystagmus take place and in what direction the body is moved or is felt to be moved. The general terms, nystagmus or vertigo without more definite description, do not give us any aid for diagnosis.

20. DR. ESCHWEILER (Bonn). **Demonstration on the pathology of empyema of the frontal sinus** (with specimens and drawings).

Four cases of chronic empyema of the frontal sinus are reported which presented entirely different pictures. In Plate I. the normal type of mucous membrane is described. This is very much thickened, and in the thickening all layers evenly participate.

Plate II. shows a similar picture, but the subepithelial layer presents a more marked infiltration, so that a division into two layers is no longer possible. There are more cross-sections of blood-vessels and the surface of the mucous membrane shows high papillæ.

In Plate III. the mucous membrane is very much thickened. The edge of epithelium appears on the surface and presents a very marked formation of tags. The subepithelial connective-tissue layer is divided into a more firm and a more loosely joined layer. In comparison with the two preceding specimens, the pronounced round-cell infiltration and the richness in blood-vessels are noticeable.

In Plate IV. the papillary hypertrophy obtains its most marked grade. The epithelium is thick and in places shows mucoid degeneration. The round-cell infiltration is pronounced, sometimes diffuse, and occasionally in areas.

Plate IV., *b*, of the same case, shows the mucous membrane from the posterior surface of the frontal sinus with hemorrhages in the tissue and ulcerations. Papillæ also are formed in these

cases, and there is a relatively broad basal membrane under the epithelial layer.

These various types of pathological changes correspond to the various clinical forms. Case 1 shows a more purulent discharge from the nose without any tendency to hypertrophy; the inferior sinus communicates with the nose, it contains no pus, and has only a thickened mucous membrane. In Case 2 there were but little discharge, foetid scabs in the nose, small polypi, and atrophy of the mucous membrane. In Cases 3 and 4 there was pronounced cream-like pus with marked swelling of the nasal mucous membrane. In Case 4, in addition, there was an abscess with a bony fistula in the outer wall.

21. Dr. KREBS (Hildesheim). On caries of the medial wall of the tympanum.

The author has observed cases of chronic suppurative otitis where before operation the inner tympanic wall was exposed and did not present any suspicious signs. After operation, caries was observed in the tympanic inner wall. He believes that this post-operative caries was produced artificially, by mistakes during operation or during the after-treatment. These mistakes occur either by direct injury with the chisel, the remaining behind of fragments of bone in the tympanum, pressure with the protector, incautious use of the sharp spoon; during the after-treatment, by mistakes in asepsis, careless probing, too tight packing, too frequent changes of dressing, improper use of caustics, especially of chromic acid. Finally, the treatment and cause of genuine caries are described.

Discussion.—JENS recommends in place of the protector a pledget of gauze, placed in the aditus.

22. Dr. HAUG (Munich). On the conservative treatment of suppurations in the attic.

The author reports that in the course of six years he has been able to cure sixty-four out of ninety-eight suppurations in the attic, though his method is not suited for all cases. It consists in, first of all, enlarging, if necessary, the site of perforation, so that a tympanic canula of large calibre can be introduced. The irrigations are made with a solution of permanganate of potash or boric acid. The cavity is then dried, followed by a slow injection of a solution of perhydrol 10.0, in equal parts of alcohol and glycerin 20.0. This solution is retained for one quarter hour in the ear, with the head turned toward the opposite side. The

canal is then dried and a small pledget of cotton, soaked in a strong solution of iodine-potassium iodide-glycerin inserted. The canal is then packed with gauze. The procedure is sometimes very painful. If necessary, it is repeated in ten days. Haug has never repeated this procedure more than three times, because it is without avail if the case has not healed up at that point.

23. Dr. F. ALEXANDER (Frankfurt). On ocular complications in diseases of the accessory nasal cavities.

Two rare cases of ocular complications are reported. The first is that of a man who suffered after influenza from an acute attack of left-sided sphenoidal empyema and of right-sided posterior ethmoidal empyema, with bilateral papillitis. The empyema was widely opened from the nose on both sides. This was followed by a complete cessation of the ocular symptoms. In a second case there was an abscess in the vitreous of the right eye in left-sided empyema of the antrum, with involvement of the left anterior ethmoidal cells. Operative treatment of these and of the maxillary antrum resulted in disappearance of the abscess of the vitreous, with marked improvement of the vision (from counting fingers at $\frac{1}{2}m$ to $V = \frac{1}{6}$). The author regards these rare complications as metastases, for which he has observed no analogon in literature.

24. Dr. MANASSE (Strasburg). Demonstration of microscopic specimens.

These were obtained from the labyrinth of a man who had become deaf fifteen years before death, from an injury to his head. A fissure is observed in the promontory and stapes running an exactly symmetrical course. At present, after fifteen years, there is no bony but only a connective-tissue union at the site of fracture. There is, in addition, an extensive new formation of connective tissue and bone in the vestibular apparatus and in the cochlea, with atrophy of Corti's organ, of the cochlear ganglion, and with foci of degeneration in the auditory trunk.

REPORT OF THE TRANSACTIONS OF THE
SECTION ON OTOTOLOGY, NEW YORK
ACADEMY OF MEDICINE.

STATED MEETING, MAY 11, 1905. DR. HASKIN, ACTING CHAIRMAN.

Case of cholesteatoma of the middle ear and mastoid.
Presented by Dr. TOEPLITZ.

The patient, a young man, twenty-four years of age, presented himself at the beginning of December, 1904, with an otorrhœa of the left ear, which was an exacerbation of a former trouble. There were scanty discharge and granulations coming from the attic, and some caries in the middle ear and toward the region of the antrum. There were also some black masses which seemed to be cholesteatomatous. After curetting the ear, operation was advised. His former history was, that at one year of age he had had scarlet-fever, followed by a discharge from the left ear, which continued until he was fourteen years of age, when he was first operated upon by a member of the Section for acute mastoiditis. The year before, he had been operated upon for polypi of that ear, so it might be considered a chronic condition. The discharge continued after the first operation, and in 1899 another member of the Section made a radical operation. After this there was no discharge for four years, until the symptoms appeared in the beginning of December.

On opening the mastoid, an extensive destruction of bone was found leading into the middle ear. The posterior wall had been entirely removed at the second operation, so that it was only necessary to remove the outer wall and what bone was left. There was considerable cholesteatoma in the middle ear and mastoid, and it was thought best to leave a permanent opening, so that the ear could be watched. In order to do this, a Panse flap was first made, then a flap from the posterior edge of the

mastoid, an inch and a half long, was turned in and stitched in place; Thiersch grafts were applied to the scalp from where the flap had been taken, and also to the lower edge of the wound. The posterior flap healed readily; in the third week after the operation the inner cavity was covered with a graft, which completed the operation. The patient was perfectly well inside of seven weeks, and the entire cavity is now lined with skin, and the ear is in excellent condition. It will be an easy matter now to close up the opening, and the deformity will be very slight.

Report of a case of panotitis resulting in meningitis, with pathological findings. By GEORGE S. DIXON, M.D. (Published in full on pages 479-482.)

Discussion: Dr. TOEPLITZ said that he was very glad indeed that he was able to be present, and learn the kind of work that was being done here in this line and to see the specimens which had been presented, and that Dr. Dixon and his associates were certainly to be congratulated on the character of the work that was being accomplished. It was just the kind of work that Moss and Steinbrügge had done in Germany for years in a very painstaking way, and he had not known before that this kind of pathological anatomy of the middle ear was being studied in this country.

Dr. EAGLETON inquired whether the cases showing Friedlander's pneumococcus presented any unusual features in their history.

Dr. DIXON replied that he had intended looking this matter up and giving the statistics of the Infirmary, but that the histories were not available, and he had not been able to do so yet. From his recollection, however, it seemed that the *bacillus mucosus capsulatus*, a better term than Friedlander's pneumococcus, has been responsible for a great deal of latent trouble. The case just reported was peculiar. It was his belief that the patient had this trouble latent throughout her temporal bone, and that it only needed irritation to give it another start, and this irritation was furnished when the probe touched the stapes, dislocated it, and let the pus through, thus promoting interchange. There may have been pus in the labyrinth already—probably was, as the length of time between the chill and her death was so very short that he did not believe the great destruction which existed in the temporal bone could have taken place within that interval. The process must have been going on before. Another point—he

believed if a differential blood count had been made when the case first came in important data would have been obtained. It is now generally conceded that if there is even a slight leucocytosis, with a polynuclear count averaging over eighty per cent., an exploratory operation is permissible. The Doctor repeated that he was becoming more and more suspicious when he found that he had to deal with Friedlander's pneumococcus, though he was not prepared to go on record in this matter until he was able to go over the records of the Infirmary and straighten the matter out. The cases which he remembered, however, had been very unsatisfactory.

Dr. WILSON inquired whether these had been pure cultures or mixed infections.

Dr. DIXON replied that it was a pure culture. As a rule, the secretion examined was from the external canal. Generally one germ was found to predominate, and that germ was held responsible. Certain germs in preponderance in smears were accepted as guides. In a vast majority of cases you would find not more than two germs, and as a rule the one that predominated in the discharge would predominate in the culture, but this was not always true.

Dr. TOEPLITZ told of a case which he had presented to the Section last year, a young man of twenty-four years of age, upon whom he operated at the Post-Graduate Hospital a year and a half ago, in whom the only sign of a suppuration going on was a leucocytosis of 30,000. The patient looked very ill and was running-down in health, but in spite of all kinds of examinations—typhoid, malarial, leucocytosis, and blood—no other cause was found. This was also a mixed infection, with a diplococcus predominating. Operation was finally decided upon, and when the cerebellum was exposed there was no abscess, but upon proceeding posterior to the sinus a deep-seated abscess was discovered. After this was removed the patient went on to recovery, but the only guide to the deep-seated suppuration was the leucocytosis.

REGULAR MEETING, OCTOBER 12, 1905. DR. EMIL GRUENING IN
THE CHAIR.

Exhibition of Specimens.

Sequestra involving the facial canal and roof of the horizontal semicircular canal removed in the course

of a radical operation. No facial paralysis. By J. F. MCKERNON, M.D.

The patient was a girl, seven years of age; gave the following history: After an attack of scarlet fever in August, 1902, the left ear became inflamed. Three months later a mastoid operation was necessary. The wound did not heal, a discharging sinus remaining. In February, 1903, the wound was curetted and a considerable area of necrotic bone removed. A third operation was necessary in April, 1904, when further granulations and more dead bone were removed. After this the condition still remained unchanged, a sinus existing leading directly into the middle ear, and there was an abundant discharge of pus from the ear. The fourth operation was undertaken in September, 1904, when a sequestrum of bone was removed in the region of the anterior zygomatic root. In May, 1905, another operation was performed, the malleus and incus being removed and the middle ear curetted. This resulted in a decrease of discharge from the ear but the posterior wound continued open.

When I first saw the patient the upper two-thirds of the mastoid wound were covered with unhealthy granulations with a thick discharge. The auditory canal was filled with pus, with total absence of the drum membrane. Areas of softened bone were present in the middle ear. Another operation was suggested, and this, the sixth, was performed September 7, 1905. The operation revealed extensive destruction of bone in the inner table of the mastoid process, in the zygomatic region, in the tympanum, about the tubal opening, and in the floor; there was a perforation through the tegmen tympani. Upon inspecting the region through which the facial canal passes, that portion of it, corresponding to where the nerve leaves the skull, was found to be more prominent than usual, and upon using the probe seemed to be loose and held down in its position by adhesions. These adhesions were removed with the director and forceps, by a process of picking at them similar to a dissection when glands in close proximity to vessels are removed, and after several minutes of this work the sequestrum of bone, which I show you here and designate as No. 1, was removed, and upon examination it proved to be the roof of the canal, showing distinctly the groove for the nerve on its under surface. In separating the adhesions which bound this down, it was noticed that a small mass in the region of the horizontal semicircular canal was movable, and this was found to be bound

down by adhesions, which were separated in the same way as described in the other sequestrum, and upon its removal showed that it was a portion of the roof of the horizontal semicircular canal, showing the characteristic markings of this bone. This is the specimen, No. 2, which I show you. After removal of the first sequestrum the slightest touch of the probe on the nerve caused distinct twitching of the muscles of the eye.

The wound was dressed in the usual way and closed posteriorly. The child made an uneventful recovery. There was no facial paralysis. The posterior wound healed rapidly, and at the present time the middle ear is practically well.

This case illustrates very well the necessity for performing the radical operation where the discharge continues from the middle-ear cavity for any time after the mastoid has been opened and properly drained. The indications for this operation are also, I believe, quite as distinct where, previous to a mastoid involvement, we have to deal with a chronic purulent discharge from the middle ear, for in these cases if the mastoid is simply opened and drained a very large proportion, if not all, of these cases continue to have discharge from the tympanic cavity, and sooner or later we are confronted with the necessity of relieving this condition.

Sequestra involving facial canal removed in course of radical operation. Facial paralysis existed before operation. By W. H. HASKIN, M.D.

Dr. HASKIN stated that he wished to show this specimen in connection with that presented by Dr. McKernon. The woman had suffered for many years from a suppurating ear, and finally came to the Manhattan Eye and Ear Infirmary for treatment. Operation was advised, and as soon as the cortex of the mastoid was removed pus flowed out profusely. Further examination showed the inner extremity of the posterior wall of the canal to be necrotic, and this large piece of bone occupied the place of the facial canal. It was loose, and was picked out with the forceps. When the patient entered the hospital she was suffering from intense pain, with a subdural abscess, and marked facial paralysis, which she had had for a year. She recovered from the operation, but not from the facial paralysis.

Dr. BALLIN presented an **electric lamp** which he had observed in an office abroad, this summer. He showed it on account of its simplicity, as it can readily be made by any one.

It consists of an ordinary 16-power incandescent light, which is incased in a hood made of ordinary plaster of Paris. It has a round opening on one side about two and one-half inches in diameter, and when the current is allowed to pass the light thus produced is very intense—almost double the ordinary power.

The advantages of this lamp lie mainly in the fact that it is easily portable and does not consume any more current than the ordinary incandescent light. It also does not emit much heat.

Dr. GRUENING said that it certainly was a good light and seemed well adapted for use with a reflector.

Dr. EMIL MAYER said that he could testify from experience that he has found it of great value.

Presentation of patient and report of a case of deformity of the auricle, resulting from perichondritis following a radical operation. By W. H. HASKIN, M.D.

Dr. HASKIN said that, as the Section could see, the auricle was practically destroyed. The wound had healed perfectly and the ear within was perfectly dry. He believed that this case of perichondritis was due to the previous condition of furunculosis, and not to infection from the radical operation properly speaking. As far as he could learn the condition was very unusual; she had not been able to find the reports of any cases in recent literature.

Discussion.—Dr. HURD said that he had seen the case two days before the opening of the swelling, and at that time he could feel no fluctuation. It was opened behind the ear and pus was found. The focus of the infection seemed to be in the flap where it was attached to the bone behind. It might have been a furuncle. At that time there was no cartilage, the concha being entirely destroyed, and nothing but skin in front.

Dr. ARNOLD KNAPP said that he did not think perichondritis was at all rare, especially since the introduction of the radical operation, and that most of the members of the Section who operated must have encountered such cases. The poor results generally obtained were, in his opinion, due to the following cause: the focus of the infection is generally in the cartilage, a tissue which is poorly nourished and consequently recovers slowly; it is not directly influenced by the expectant treatment usually followed—antiseptic applications and incisions. Cases of

perichondritis after operation should be treated radically. As soon as the condition appears, the cartilage should be exposed and all disease thoroughly removed. As soon as the diseased cartilage is removed, the inflammation will subside and a deformity of the auricle need not necessarily follow. This treatment is very painful and requires a general anæsthetic.

Dr. GRUENING said that some fifteen years ago he had written a paper on perichondritis, and at that time the treatment of such cases was largely expectant. When fluctuation showed at the posterior or the anterior surface of the auricle, incisions were made. At the time he wrote the paper he had treated two cases by transfixion and drainage; he transfixed the auricle and put a drain through the transfixed portion, and both cases healed without deformity. This was not so thorough a treatment as that which Dr. Knapp recommends, but it was a better treatment at that time than the treatment of the surface of the skin, and he thought it would still be a good treatment.

He agreed with Dr. Haskin about the possibility of this case being due to the existence of the furuncles. He had not seen any cases of perichondritis after his radical operations, but he might do so some day. If you make the flap and cut the cartilage, it is very likely that the condition would frequently follow. He thought the title of the report was somewhat misleading—it was not a destruction of the auricle, but merely a perichondritis. He thought that if cases were treated as thoroughly as suggested by Dr. Knapp, or if a transfixion of the auricle were practised early, the deformity would not be so great.

Dr. KNAPP, replying to a query as to in how large a percentage of cases he had seen perichondritis follow the radical operation, said that he could not give the exact percentage; reference to this condition was often made in literature. Within the last two years a paper had appeared in the ARCHIVES, written by Professor Koerner, in which he confirmed the association of post-operative perichondritis with the presence of the bacillus pyocyaneus, which is a very striking observation, and the speaker would like to ask Dr. Haskin whether he had observed the characteristic greenish saturation in the dressings.

Dr. HASKIN replied in the affirmative.

Electrolysis in the treatment of chronic Eustachian stenosis. By F. T. HOPKINS, M.D. (Published in full on pages 495-501.)

Dr. KENEFICK said that some years ago, while practising this treatment in the New York Eye and Ear Infirmary, he had written a paper on this subject, reporting his results. Since then the work has been carried on by others. In private practice there is not so large a number of cases to select from as in hospital work, but in the many instances in which he has followed this treatment his opinion remains the same as to its efficiency. He was inclined, however, to feel that he would more and more restrict its application to cases of long standing, and especially those chronic cases which complain of extreme tinnitus and vertigo without extreme deafness. Such cases are found mostly in adults, and date back to attacks of scarlet-fever or diphtheria in childhood. In these cases the hypertrophic condition has largely disappeared, and the stricture is of a more dry and less vascular character, and application of the electric bougie is attended with less reaction. In these cases also he had known the bougie to produce, as far as he could make out, a resorption of the fibrous tissue, as was ascertained months after a single application. This was followed by a relief of the tinnitus and vertigo, and restoration of the hearing. Since reading his paper on this subject, two of his most successful cases were themselves otologists, whose cases corresponded to those conditions just described, of many years' standing. Perhaps it is most efficacious in those cases of long standing in which the complete, or almost complete, closure of the Eustachian tube takes place at the tympanic orifice. On examination with the otoscope these cases give the impression that the tube is clear, and in such cases one has to be persistent in reaching the tympanic cavity. Dr. Hopkins has spoken of the "tympanic expression." That is very marked. The tube is so poorly supplied with nerves that the bougie does not cause the same degree of pain that it does in passing across the posterior wall of the tympanic cavity. He thought it passed along the tympanic membrane in many instances, thus causing pain and irritation. In a general way then, he would say that long-standing closure of the tube, tinnitus, a medium degree of deafness, and extreme vertigo were favorable cases for the electric bougie in proper hands. Dr. Hopkins had spoken of the care necessary in the technique of the operation. Much to the speaker's surprise, at the time his paper was published he received inquiries from every direction, two from physicians in neighboring States, saying that they noticed he insisted upon the use of the *negative* pole, and

would he explain why. Of course it was not to be wondered at that these men sometimes had difficulty in removing the bougie from the tube, the point being that they turned on the positive current into the gold bougie, setting free oxychloride of gold inside the tube, and instead of liquefying, and thus lubricating the region, the positive pole dried it, and caused it to stick. The only way to remove it is of course the introduction of the negative current. Dr. Hopkins said that the current should be shut off before removal. Of course he means before the removal of the catheter from the nasal chamber, not before the withdrawal of the bougie into the catheter.

Dr. GRUENING remarked that in regard to the subject under discussion there were many doubting Thomases in the profession. There was one point in Dr. Hopkins's paper which struck him particularly—where he said that we must not inflate or we immediately shall have emphysema. If you get that, there is a false passage. If you see emphysema after the ordinary use of the bougie, you can be sure that you have made a false passage.

Dr. PHILLIPS said that he was a firm believer in the use of the bougie in cases of deafness due to various forms of obstruction of the Eustachian tube, but that he was not an enthusiastic believer in the use of the electric bougie. For a considerable time he had used it in all his cases. He understood the technique perfectly, and was surrounded by a complete and perfect armamentarium, including all electrical appliances. He had spared neither time nor patience in carrying out the requirements, and he therefore felt it his duty to report the unfortunate outcome in several of his cases. He had in his possession several gold bougies, of which from a half to two-thirds of an inch had been lost, and which ends were to-day located in the Eustachian tubes of the unfortunate patients. His experience certainly differed from that of Drs. Hopkins and Kenefick. He could not agree with the reader of the paper or with others who had described this method with so much enthusiasm, that the electric bougie was less painful than the ordinary whalebone. He himself advocated the use of the whalebone bougie in these cases, and he never used the electric bougie unless he had absolutely failed to enter the tympanum with the bone bougie, and when he failed with the bone he usually found that he failed also with the electric bougie. In his experience the results had been equally satisfactory when the bone bougie was employed. He was ex-

tremely sceptical as to whether the electric current had any particular effect on the Eustachian tube. He thought all the results could be obtained by ordinary dilatation, and that until the instrument makers could furnish a safer form of gold bougie he considered that method dangerous. In his experience, the gold bougie seemed to burn off or break at just about the distal end of the catheter, while the current was on and the bulbous end was embedded in the stricture. This had happened with him four or five times. Others had reported similar experiences. He had seen no especial evil effects from these broken bougies, and in one instance the piece had worked out. The patients still suffered from the deafness and tinnitus, but were not conscious of the presence of the bougie in the tube. He did not altogether condemn the electrical bougie, and expected to use it at times, but he felt that there was no special virtue in the current itself. He was never afraid to inflate after he had used the bone bougie, and got the benefits of inflation immediately after passing it, as he had not been able to do with the electric bougie. He had never had a case of emphysema after inflation, and he felt that this was a strong point in favor of the bone bougie, as he believed that emphysema always indicated a false passage. As to his electrical equipment, he had every improvement that could be procured, and never used more than thirty volts or carried the current above five milliamperes, usually only three or four.

Dr. SIMPSON remarked that inasmuch as Dr. Hopkins's paper was mainly on technique, he would confine his remarks to that point. He had used electrolysis a great deal, and as far as overcoming the stricture was concerned he felt that when there was a definite organized stricture this was the best if not the only method of relieving it. He thought it very unsafe to attempt to dilate an organized stricture by means of any kind of force. You get a wound. You do not get a wound in the pure sense by electrolysis, you get a chemical absorption. Another point was that a great many strictures which at first resisted the passage of the bougie could be readily overcome by the use of a little bland oil, like benzoinol, injected into the tube through the catheter, and then passing the bougie. It was quite surprising how many strictures could be overcome by simply lubricating the tube in this way, thus obviating the need of electrolysis. He thought that a great deal of error was occasioned by not seeing where the Eustachian catheter was going, and believed that the cathe-

ter should always be passed into the tube with the aid of a rhinoscopic mirror, and not alone by the sense of touch. By this means you can always pass the Eustachian catheter well into the trumpet-shaped end of the tube, and this is the only way in which you can get an absolute idea of how far in the bougie has passed. Sometimes when you pass the catheter and then the bougie, instead of having the catheter flush, in, you will find that you have a space between the end of the bougie and the end of the catheter, and you cannot be sure that you are thoroughly in the Eustachian tube unless you see it with the rhinoscopic mirror. This will often save you the mortification of finding that you have the Eustachian bougie in the fossa of Rosenmüller instead of in the tube. He was quite surprised to learn that Dr. Phillips had had such an unfortunate experience with the breaking of the gold bougie. He himself had had this accident happen but once, but felt that he was at fault on that occasion. Another condition which sometimes occurs, and which was difficult to explain, was that sometimes in withdrawing the Eustachian bougie it was impossible to pull it out without exerting a great deal of force—taking a pair of ordinary nippers and pulling with all one's might. He was not sure what caused this, but it happened in his practice every once in a while, though it did not seem to produce any trouble.

Dr. HARRIS said that some years ago at the Manhattan Eye and Ear Infirmary he had devoted most of a year to work of this character. He had approached the subject in an unbiased manner, and reported his results shortly afterward before one of the national societies. Some time later he published a second series which he had reported at the American Otological Society, and his conclusions then and now are the same—that the electrolytic bougie is of value in certain carefully selected cases and in competent hands. Dr. Phillips's statements were a little more pessimistic than he could endorse, but were in the main his views. He complimented the reader of the paper on the thorough manner in which he had presented the optimistic side of the question, and said that it was always interesting to hear Dr. Kenefick's views, though he did not think the latter was quite so optimistic as he had been a few years earlier. Dr. Harris did not think that the accidents which had occurred could always be ascribed to improper technique—certainly not in many instances. He had known of many such that had occurred where

the proper instruments had been employed in the hands of competent operators. He had known of new bougies breaking and these are not the only accidents that happen. It could not be too strongly emphasized that this method should only be used by the most competent hands. Consequent to the reading of Dr. Kenefick's paper there was a wave of enthusiasm on this subject which swept over the country, and the bougie was often used improperly, and in many conditions where it was not indicated. He thought it should only be used after the whalebone or celluloid bougie had been tried and failed to produce the desired result. He had often known of the return of the condition after the stricture had been dilated. It was very interesting to see how the personal equation enters into this matter. In the series of cases which he had reported some were relieved from the tinnitus, others were not. The actually existing condition should also be borne carefully in mind. Is there a well organized stricture which disappears? Dr. Dench has called attention to what may happen when that occurs. Does it not pass through some band of mucous membrane instead of going through the proper channel? He thought it wrong to condemn the method altogether, but that the cases should be selected with great care, and that it should only be resorted to when other methods had failed. Used with the proper asepsis and skill to which the reader of the paper has called attention, it is an aid which we cannot afford to dispense with.

Dr. McKERNON said that the occurrence of an emphysema could be plausibly explained. The point of the bougie after emerging from the catheter sometimes does not enter the calibre of the tube but simply impinges there, and if any pressure was used it was easy to cause an abrasion. This does not take place in the body of the tube but at the pharyngeal orifice, and then if inflation takes place in a few hours we are likely to get an emphysema. He had used both methods of opening the tube, and thought that the electric bougie, with care and attention, in proper hands, and selected cases, had its uses. He had helped cases with it. He had not had a series of cases of complete cures, but had had a series of selected cases where relief had followed the use of this method after other methods had failed. He thanked Dr. Hopkins for the paper, for he had emphasized points of great importance. He thought that the gold bougie had often been used where the originator of the method had not

intended. He did not think that every case of Eustachian stenosis, when first seen, even after having been seen three, four, or five times, should be treated at once with the bougie. The thickened condition which is in the cartilaginous portion of the tube would often disappear under inflation. He was convinced, however, that the method was of positive value in certain selected cases.

Dr. KENEFICK asked Dr. Phillips where the bougie usually broke—just where it left the catheter, or farther along after it entered the tube.

Dr. PHILLIPS replied that it seemed to him it usually broke at the point where for the time being it was in contact with the distal end of the catheter. It might, however, be at some distance from this point in some cases, but never inside the catheter.

Dr. KENEFICK replied that he had made from 150 to 250 applications of the bougie, but had never had an untoward result or accident of any kind, not even an acute otitis. He knew that bougies had broken in capable hands, and felt that he himself had been fortunate. He was always careful to remove the bougie while the current was passing. Both in the application and removal the lubricating effect of the current was required. He had never had such an experience as Dr. Simpson mentioned. Dr. Harris seemed to think that his enthusiasm on the subject had decreased, but he wished to state that he was as enthusiastic about it now as he had ever been for the class of cases described in his paper. He had said then distinctly that the cases reported were of long standing and had been treated by all the known methods, and with this class he continues to get the same good results.

Dr. SIMPSON suggested that possibly the breaking of the bougie at the point mentioned by Dr. Phillips might be due to improper insulation of the catheter—that possibly where it leaves the current it might come in contact with the silver catheter. To prevent this, he himself invariably uses a rubber catheter, and had never had any trouble.

Dr. MCAULIFFE said that he had used the bougie with some success, and thought the explanation was somewhat unsatisfactory. The bougie could fit only the smallest part of the tube, consequently how could it engage or enlarge the stricture in the wider parts. In order to determine the effect of electrolysis he had tried the effect of the electrolytic needle on trachoma, and

had passed the needle time after time without any effect. He thought that the true explanation was found in the action of the galvanic current on the muscles.

Dr. PHILLIPS said that he wanted to emphasize the question of force. It was his experience that you have to use the same force with the electric bougie as with the ordinary bone bougie, in order to get through the stricture. He also desired to recommend the use of the diagnostic tube before passing the bougie, as the patient's word that air was entering the tube was unreliable. There would be fewer false passages if the presence of the tip of the catheter in the mouth of the Eustachian tube was demonstrated by the Politzer bag and diagnostic tube.

Dr. GRUENING said that the reading of this paper seems to have reopened the whole question. A wave of electrolytic enthusiasm swept over the country some years ago, but there was now rather a low tide in the current. Dr. Hopkins had presented the subject logically and well, but had demonstrated nothing. He wished to make this statement before Dr. Hopkins closed the discussion.

Dr. HOPKINS said that he had no further remarks, except in reference to the trouble which Dr. Phillips had experienced in the breaking of the bougies; he found that the bougies made of one piece of gold were safer and better than those offered by most instrument-makers consisting of two pieces, the tip being attached to the stem of the bougie.

Concerning the safety of **primary skin grafting after the radical operation**, Dr. GRUENING said that, the day before, a post-mortem had been made on a case where a most beautiful plastic operation had been performed in connection with the radical operation for chronic otitis media. The canal and also the tympanic wall were lined with skin, but behind that skin was pus and the patient died of meningitis. Here was a case of a man operated upon a few months ago, with a large flap lining the whole canal, resulting apparently in quick healing. He mentioned this matter in order to bring about a discussion of the propriety of making these very large flaps and covering over the denuded bone. He felt that the practice might require a little revision.

Dr. PHILLIPS inquired if it was one of the large flaps from the outside, and Dr. GRUENING replied in the affirmative.

Dr. MCKERNON inquired whether the dura had been exposed in the primary operation, and if the dura was covered by the graft.

Dr. GRUENING replied that he could not tell about this. He had only seen the case the previous day before the patient died, and found that the flap operation had been done. The autopsy showed a serous meningitis and pus behind the flap.

Dr. MCKERNON said that he thought it was bad practice to use a graft over an exposed area of dura. Last summer he had seen a case where the radical operation had been done for chronic purulent involvement of the ear. The patient was seventeen years of age. Five weeks after the operation the temperature rose to 104.5° F, and in three days he gave all the evidences of intracranial pressure. Operation was performed, and a large abscess was found just above the tegmen, and was evacuated. The pus in the abscess cavity had no odor. After evacuating the pus, a sinus was found leading from a perforation in the tegmen directly upward and inward to the abscess cavity. The patient recovered.

Dr. KENEFICK inquired the length of time that had elapsed since the operation, and upon receiving the reply that this had not been ascertained owing to the condition of the patient, said that he had asked because the question arises as to whether any operative procedure had been suggested.

Dr. GRUENING said that he had seen the man *in articulo mortis*, and no diagnosis had been made, and there were no indications to proceed immediately.

Dr. ARNOLD KNAPP said that it hardly seemed fair to condemn the practice of skin-grafting after the radical operation from the incomplete report of this case. The autopsy report simply stated that there was some pus behind the graft and that the patient died of serous meningitis. From these data it cannot be definitely stated that the meningitis arose from the ear. Of course the great objection to planting grafts at the first operation is that one is apt to overlook bone which is not entirely healthy, though a graft will not adhere to a diseased surface.

Dr. MCKERNON inquired whether he considered it good practice to put a flap over an exposed dura.

Dr. KNAPP replied that in his opinion it would be perfectly safe to do so if the dura seemed perfectly healthy and there were no intracranial symptoms.

Dr. MCKERNON replied that the reason he had asked this question was that aside from the case just reported he had seen a similar one a year ago. The meningitis might have occurred

without the graft being placed, but in these cases there was a distinct area of dura exposed, and it occurred to him that when the graft was put on the adhesions formed might have prevented the pus from coming out.

Dr. GRUENING said that he felt that this subject was not absolutely settled and was still *sub judice*. It was perhaps better to have a slower healing, and not a large flap covering up bone which may be diseased. He thought it was difficult to know the absolute condition of the bone or whether the skin was absolutely clean. There are many germs which might be transplanted, and this question should be considered.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1904.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY.

374. DENKER. The Eustachian tube of the ant-eater. *Zeitschr. f. Morphologie u. Anthropologie*, Bd. viii., pp. 1-10.

375. ZIMMERMANN. On the physiologic importance of the labyrinth windows. *Arch. f. Anat. u. Physiol.*, 1904.

376. ZIMMERMANN. Additional observations on the importance of the labyrinth windows. *Ibid.*

377. TOERNE. On the bacterial conditions of the accessory cavities of the nose and their protective agencies against bacteria. II. and III. *Nordiskt medicinskt Archiv*, 1904, Abt. I., book 2, No. 6.

374. A large bony cavity which is situated orally off the bulla ossea in the *Myrmecophaga jubata*, and which is not present in any other vertebrate, is absent in the *Myrmecophaga didactyla*.

It has been shown that the Eustachian tube exists in the *Myrmecophaga didactyla*.

The tube in this animal is not a sheath but a broad cavity surrounded by a membranous wall. In place of an osseous tube there is a round aperture in the posterior lower corner of the tympanum to which the membranous tube is attached.

376. ZIMMERMANN repeats his views on sound conduction through the cranial bones and corrects the criticism recently made by Lucae. H.

377. The subjects for examination consisted of fresh calves and human cadavers twenty minutes after death. The maxillary antra were broadly opened and in various places lines of lamp-

black were made. It was ascertained that the ciliated movement about the openings of the sinuses in all directions converged toward the respective sinuses, then passing along the connecting canal farther into the nasal cavities, passed principally forward, though the author has observed a tract which passes backward. In the inner wall the rapidity of movement varies from 0.4 to 1.0 mm a minute. It is slower in the lateral wall and at 2 cm distance from the opening can no longer be observed. There is no observable movement at the floor.

Bacteriological examinations of the discharge from the maxillary antra were also made.

JÖRGEN MÖLLER (Copenhagen).

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

378. SCHMIEGELOW. Report of the oto-laryngologic department of the St. Joseph Hospital, 1903. Copenhagen, 1904.

379. SPIRA. On the report of the out-patient department for diseases of the nose and the ear in the Jewish Hospital in Cracow in 1903. *M. f. O.*, 1904, No. 7.

380. On diseases of the ear in school-children; their frequency and importance. *Wratschebnaja Gazeta*, No. 39, 1904.

381. VOSS. Deafness. *Die deutsche Klinik am Eingange des 20 Jahrhunderts*.

378. Two hundred and seventy patients were treated; the simple mastoid operation was performed in 23, the radical in 50; 49 operations were performed on the nasal accessory cavities. Of the 51 cases of chronic otorrhœa which were treated by operation, the radical operation was performed in 44. In only 9 cases did the disease begin after the fifteenth year; in the other 24 adults it had existed since childhood. As regards the indications for operation, in 16 the chronicity of the affection was the indication; in 20 there were also symptoms of retention; in none of these cases were there any external signs of mastoid involvement. In 8 cases there was a vital indication for operation, consisting in marked symptoms of retention, frequently with redness and swelling of the mastoid region. One of these cases died, a purulent meningitis setting in 15 days after operation. In 29 cases complete recovery occurred; in 10, recovery was only partial. In 3 there was necrosis of the labyrinth, in 16 cholestea-

toma. The hearing was improved after operation in 22, in 5 it was unchanged, in 6 it was diminished; in 10 no details were given: 1 died.

The report also contains the article of SCHMIEGELOW on the relation between diseases of the nose and of the eye, which has been published (Verh. d. dan. oto-lar. Ver., *Arch. f. Laryng.*)—also an article by Dr. Bentzen on "Stenosis of the Larynx."

JÖRGEN MÖLLER.

379. Of the cases reported, the following are of special interest: a hemorrhage into the labyrinth with Ménière's symptom-complex occurring after violent sneezing; epistaxis which could be controlled by no treatment until an application of 50 % chlorid of zinc was made. In chronic affections of the tube and of the middle ear the author has practised injections of a few drops of a mixture of adrenalin and of 5 % cocain solution into the tube. The results were favorable though transient; the hearing was improved and the noises diminished. PIFFL.

380. Three hundred and fifty-three scholars varying in age between ten and nineteen were examined. The examinations were made with Politzer's acoumeter and whisper. Those examined were divided into 5 groups: Group 1. Those who did not hear the acoumeter or whisper voice, or only up to a distance of 5*m*. These were 3 % for the acoumeter and 2.3 % for the whisper. Group 2. Those who could hear the acoumeter and whisper at a distance of 6–8*m*. These were for the acoumeter 5.5 %, for the whisper 3.8 %. Group 3. Ears which could hear acoumeter and whisper at a distance of 9–10*m*. These were 6.6 % for the acoumeter, and 5.4 % for the whisper. Group 4. Those hearing the acoumeter and whisper at a distance of 11–15*m*. These were 23.9 % for the acoumeter, and 81.8 % for the whisper. Group 5. Those who could hear the acoumeter or whisper voice at a distance of 16*m* or more.

The author deduces from these results important points in the prevention and treatment of ear diseases in school-children.

SACHER.

381. This is a general description of the causation, pathology, and treatment of deafness. HARTMANN.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

382. LANNOIS. Disturbances of hearing in herpes zoster. *Ann. des mal. de l'or.*, 1904, Sept.

383. HAIKE. Supplemental investigations on the action of salicylate of soda and of aspirin on the ear. *A. f. O.*, vol. lxiii., p. 78.

384. HABERMANN. On ear diseases following cretinism. *Ibid.*, vol. lxiii., p. 100.

385. LAKE. The influence of disturbances of the general health on ears which already are affected with mild lesions. *Arch. internat. d'otol.*, etc., vol. xviii., p. 737.

386. CHAUVEAU. A case in which mastoiditis and maxillary sinusitis disappeared during an attack of acute articular rheumatism. *Ibid.*, vol. xviii., p. 823.

387. COSTINIU. Examinations of the ears of railway employees in regard to their length of service in the company and the nature of the substance used in firing the locomotives. *La presse oto-laryngologique belge*, 1904, book ii.

388. DELIE. Tobacco and hearing. *Ibid.*, 1904, book ii.

382. Herpes zoster in the distribution of the trigeminus, facial paralysis, and disturbances of hearing occurring in the course of cold and in infectious diseases is a well-known but rare symptom-complex of neuritis. It is not possible to determine whether in these cases the disturbance of hearing depends upon a lesion of the auditory nerve or on the facial paralysis (paralysis of the stapedius), or whether the auditory nerve can be affected in the course of a herpes zoster or not. These two cases show that in the course of herpes zoster of the neck and of the forehead without facial paralysis a disturbance of hearing occurred.

BOENNINGHAUS.

383. Following the experiments of Wittmaack, who has shown that the action of quinine does not consist in producing hemorrhages in the ear but in changes in the ganglion cells of the auditory ganglion, the author has taken the same course of investigation for salicylic acid and aspirin. The suffocation and dyspnoea in the animals treated with salicylic acid were avoided by killing the animal before the onset of the action of the poison, and by the use of artificial respiration the action of the poison was observed up to death. As a comparison, animals which had been suffocated and others which had been killed with strychnine were employed. In the latter, hemorrhages and hyperæmia were present. In the animals poisoned with salicylic acid this was not the case. Agreeing with Wittmaack, he found anatomic changes in the ganglion cells of the vestibular ganglion as well as in the spiral ganglion, which affected principally the Nissl bodies. In the auditory tract a degeneration of the medullated sheaths could be demonstrated.

384. Previously reported.

385. After giving six case-histories, the author draws attention to the well-known fact that disturbances of hearing of a light grade can be the result of bodily or mental fatigue, and can be cured by a general treatment. OPPIKOFER.

386. In one case mastoiditis, in another empyema of the maxillary sinus, were healed at the onset of an acute articular rheumatism. It does not, however, seem to us quite clear that the cure of these two affections was produced by the rheumatism. In the first case the patient, against the advice of his physician, undertook to travel, notwithstanding severe pain in the ear and tenderness of the mastoid process. When the articular rheumatism began, he was required to keep to his bed for a number of weeks, and then the symptoms in the ear disappeared. The rest in bed, and not the articular rheumatism, probably produced the favorable result.

In the second case, a case of empyema of the maxillary sinus of dental origin, the carious teeth were extracted but the cavity was not irrigated. Recovery nevertheless occurred. The possibility that after removal of the carious root of the tooth a dental empyema gradually recovers is not improbable—more probable than the supposition that the articular rheumatism caused the cure of the sinus affection. OPPIKOFER.

387. In Roumania locomotives were operated up to 1888 with wood and then with coal. Later with raw petroleum, and since 1896 with coal and raw petroleum together. All machinists and stokers complain of the intense noise which the raw petroleum produces during ignition, and believe that it injures the hearing, the sight, and the nervous system. The author has himself undertaken a number of experiments in various locomotives, and found that the noise of the burning petroleum was very marked, especially if the petroleum was used pure and when the coals were not evenly distributed on the gridiron. This noise, together with the other noises of the machinery and the variations in temperature, may easily aggravate an existing ear trouble. After a while, however, the changes in the drum and in the auditory nerve generally disappear. The disturbance of hearing depends more upon the age, and especially upon the time of service in the locomotive. BRANDT.

388. Previously reported.

C.—METHODS OF EXAMINATION AND TREATMENT.

389. QUIX. Determination of hearing with whisper-voice and tuning-fork. *Annales des maladies de l'oreille*, etc., 1904, Sept.

390. QUIX. Remarks on the papers of Professor Ostmann—"Figures of Vibration and Threshold Values," and "An Objective Hearing Measure." *A. f. O.*, vol. lxiii., p. 118.

391. OSTMANN. On examination of the hearing. *Deutsche med. Wochenschr.*, No. 50, 1904.

392. URBANTSCHITSCH. On the use of mirrors for intratympanic otoscopy. *M. f. O.*, 1904, No. 8.

393. SWERSHEWSKI. On the use of tigenol in the ear and nose. *Medicinskoje Obosrenje*, No. 7, 1904.

394. TREITEL. Two cases of massage of the stapes with Lucæ's pressure probe with good and permanent results. *A. f. O.*, vol. lxiii., p. 20.

395. BABINSKY. Lumbar puncture in diseases of the ear. *La médecine moderne*, No. 47, 1904.

396. GELLHAUS. On the inhalation of menthol in diseases of the nose and larynx. *M. f. O.*, 1904, No. 7.

397. THANISCH. A new apparatus for irrigating the attic. *M. f. O.*, 1904, No. 8.

398. STEIN. Operation on the mastoid process in scopolamin-morphin narcosis. *Hospitalstidende*, 1904, No. 43.

389. The errors caused by a partial guessing of words are to be avoided. It is therefore necessary, according to ZWAARDEMAKER and QUIX, to use only those words which have an accent and where individual vowels and consonants are heard at equal distances—*aqui-intensiv*, which depends principally on whether the fundamental tone and the speech tone have the same pitch—"isozonal." Three groups of words can then be arranged—high, middle, and low zone, as has already been shown by O. Wolf, not, however, observing the monosyllables and the same intensity of vowels and consonants. As the sound-tones in the various idioms are pronounced differently, each idiom must have its own words, and in this paper Quix has selected the words for the Dutch language, Reuter has selected them for the German language, and Delsaux intends to do so for the French. If we then compare, in disturbances of hearing, the loss in hearing as determined by the whisper and the loss in hearing as determined by the tuning-fork, we find a very satisfactory correspondence.

BOENNINGHAUS.

390. QUIX questions the correctness of the laws formulated

in the first paper of Ostmann, and declares that the tables in the last paper are incorrect.

HAENEL.

391. This is a clinical lecture for students, furnishing a clear picture of the quantitative and qualitative examination of the hearing, with special regard to the results obtained with the use of his objective audiometer. It may be of general interest that OSTMANN in one-sided ear disease recognizes in Rinne's experiment a decided diagnostic aid, which in recent years has frequently been attacked. Finally Ostmann states that he has recently found that the handle of a tuning-fork does not vibrate in a longitudinal but in a transverse manner, and that the threshold value amplitude for hearing through bone-conduction is very much less than for sound perception through the ear. He hopes that this will help us in discovering the peculiar transmission of sound in the skull.

NOLTENIUS.

392. The author recommends instead of a metallic mirror one made of glass, which is said to furnish a more perfect picture.

PIFFL.

393. In atrophic processes in the nose the author has not found a 10-20 per cent. salve to be of much value. The remedy, however, can be used to advantage in purulent diseases of the ear as it is anæsthetic and astringent. On prolonged application the mucous membrane may be irritated.

SACHER.

394. In two awkward cases of chronic suppuration of the middle ear with cicatricial fixation of the stapes, the author has obtained permanent improvement of the hearing with massage of the stapes. In the first case, the hearing distance is not given; in the second case, the whisper was heard directly at the ear before treatment was begun and after the treatment at a distance of 3-5m. In the third case, the stapes could not be located. On massaging the oval membrane, the hearing distance for the whisper-voice was increased from 0 to 10cm.

HAENEL.

395. BABINSKY has observed in diseases of the labyrinth, especially in Ménière's symptom-complex, a disappearance of the tinnitus and of the vertigo, with improvement in the hearing after repeated lumbar puncture.

OPPIKOFER.

396. The author has obtained favorable results with the inhalation of menthol vapors by using an apparatus consisting of a tube by which the menthol vapor was directly applied to the larynx.

PIFFL.

397. This instrument is modelled after the pattern of an atomiser with a double bulb. The fluid is not vaporized, but is injected, by means of the tympanic canal, in a small stream into the attic. No assistance is required. PIFFL.

398. In the first two cases no unpleasant features occurred either during or after the narcosis. The third case, a boy of fifteen years old, however, presented the following difficulties: he received, four and two hours before operation, 0.0001 S. + 0.01 M., and one hour before, 0.0005 S. + 0.005 M. Although he had stood the two trial doses well, the respiration ceased, and the operation had to be abandoned. Later the cardiac action seemed also to weaken. Active attempts at resuscitation were successful. Two days later the operation was performed under ether narcosis. Asphyctic attacks occurred, and the operation was finished with difficulty. The author believes this patient was intolerant of all forms of narcosis. Three other cases are reported in which the narcosis was well borne, in two cases, however, with the addition of ether. JÖRGEN MÖLLER.

d.—DEAFMUTISM.

399. BEZOLD. Deafmutism and the instruction of deaf-mutes. *Deutsche med. Wochenschr.*, No. 48, 1904.

399. In a long paper, BEZOLD gives his experiences with the examination of the inmates of the Munich Deaf-Mute School, with the aid of his continuous-tone series from C₂ to g⁸, 16 to 50,000 double vibrations per second. According to the author, the figures of those children who become deaf or deaf-mute in the first years of life are much too small, because the parents do not recognize the true nature of the affection until in later years. In more than half of the cases deafmutism is acquired. Congenital deafmutism is more frequent in females. In later life, among all deaf-mutes, for 100 males there are only 83 females, because the boys are more frequently affected by diseases which lead to deafmutism than are the girls.

As regards etiology, direct transmission from parents to children plays a secondary rôle. Of very much more importance are consanguineous marriages. Of acquired deafmutism, cerebrospinal meningitis forms the greatest contingent—i. e., in about half of the cases, scarlet-fever 18 %, measles 2.1 %, diphtheria

1.7 %, typhoid fever 1.3 %, pneumonia 0.9 %, whooping-cough and osteomyelitis 0.4 %, in Bezold's statistics of 233 cases.

Finally, acquired deafmutism is caused in 1.7 % by mumps, and 5.6 % by hereditary lues, 6.4 % by local middle-ear suppurations, and 3 % after accidents.

The examination of the inmates of the Munich Deaf-Mute Institution gave the following results: 19.7 % were born bi-laterally deaf, and 38.4 % possessed hearing remnants, so that they could be instructed from the ear. This led to the arrangement of special classes, who were instructed by the new method and learned a speech which was entirely different from that of the ordinary deaf-mutes, and could progress very much more quickly in their studies. The method, which consists in using the ear and the eye of the pupil, with the aid of a mirror, in order to acquire a more natural speech, should be more generally known. While the attempts of Urbantschitsch to awaken the auditory nerve by systematic hearing exercises should be given up as hopeless, at the same time he ought to receive the due of having first instituted systematic instruction from the ear.

NOLTENIUS.

EXTERNAL EAR.

400. HALASZ. A dermoid cyst in the mastoid region. *A. f. O.*, vol. lxiii., p. 141.

401. NEUBORN. Rudimentary deformed auricle, with one-sided facial paralysis after hypoplasia of the nerve. *A. f. O.*, vol. lxiii., p. 113.

402. CHAVANNE. On the use of collodion in relaxation of the drum membrane. *La presse oto-laryngol. belge*, 1904, Book 10.

400. A tumor, as large as a hen's egg, situated in the mastoid process of a man, twenty-five years of age, was first taken to be an abscess, originating in the mastoid process. The tumor had, however, existed for one year, and consequently it was movable with the skin over the bone. The lack of pain and the absence of an ear disease proved the diagnosis of a new growth.

HAENEL.

401. The author considers the facial paralysis in this case to be the result of an unusually narrow Fallopian canal, which had retarded the nerve in its development. The loss of taste in the entire two-thirds of the corresponding side of the tongue and the paralysis of the palate show the site of the paralysis. The

auditory canal was shortened; the drum membrane partly atrophic; the hearing for whisper reduced to 10cm; Weber was lateralized to the affected side. HAENEL.

402. This was a case of acute purulent otitis, in a commercial traveller, both of whose drums were covered with collodion, on account of relaxation. An aurist had discovered a caries of the handle of the hammer, and had advised removal of the hammer. After irrigation, the membrane of collodion came out, and it was seen that the collodion deposited on the hammer had simulated the serous disease. The suppuration then quickly ceased. The author advises patients whose drums have been treated with collodion to be carefully observed. BRANDT.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

403. BELLIN. On the anatomy of the mastoid cells and their suppurations. *Annales des maladies de l'oreille*, etc., 1904, April.

404. HALASZ. A primary mastoidal otitis and caries. *M. f. O.*, 1904, No. 8.

405. GRADENIGO. On paralysis of the abducens nerve of otitic origin. *Annales des maladies de l'oreille*, etc., 1904, Août.

406. HAMMOND. The palliative treatment of acute mastoiditis and its limitations. *Jour. Amer. Med. Assoc.*, Nov. 26, 1904.

407. POOLEY. Fibroma of mastoid, auricle, and auditory canal. *N. Y. Med. Jour.*, and *Phila. Med. Jour.*, Nov. 26, 1904.

408. RICHARDSON. Button in the ear twenty-seven years. Deafness cured by its removal. *Amer. Medicine*, Sept. 24, 1904.

409. OPPENHEIMER. Two cases of mastoiditis with paralysis of facial nerve. Recovery of paralysis following operation. *Med. Record*, Sept. 10, 1904.

410. PACKARD. The value of early incision of the membrana tympani in the treatment of acute suppuration of the middle ear. *Med. News*, Sept. 17, 1904.

411. DAY, E. W., and JACKSON, C. Purulent otitis media complicating typhoid fever. *The Laryngoscope*, Oct., Nov., Dec., 1904.

412. MCCAW. Some interesting cases of mastoiditis, with remarks. *The Laryngoscope*, July, 1904.

403. This paper treats of the aberrant pneumatic cells, which extend very frequently in all directions from the mastoid cells into the neighboring bone. In 190 temporal bones the author found that these cells were very much more frequently present than has previously been known. Seven cases have been reported, which were observed during the last year, in which the operation

for acute suppuration showed the presence of these cells filled with purulent contents, which were situated partly over the auditory canal, partly below the facial nerve, and partly beyond and below the sinus. In the eighth case death ensued from meningitis, induced by a suppurating cell situated above the auditory canal in the posterior root of the zygoma, which had not been exposed at operation. The presence of these aberrant cells requires the systematic examination of the mastoid cells with a probe and the sharp spoon after the removal of the entire external cortices of the mastoid process. BOENNINGHAUS.

404. A woman, fifty-five years of age, complained of pain in the right ear, vertigo, deafness; later a swelling appeared beyond the ear and an abscess was formed. The drum membrane was apparently unchanged. The view of the author that this is a case of primary mastoiditis will probably not receive much support. Furthermore, the belief of the author that a severe hemorrhage which occurred during the operation was the result of an injury of the jugular bulb by the sharp spoon through the carious folds of the tympanum will also probably not be accepted.

PIFFL.

405. After an observation of six personal cases and fifteen reported cases, GRADENIGO has found that in the course of an acute otitis media, with and without perforations, characterized, however, by an abnormal latent course, a rare but typical symptom-complex sometimes is present, which consists in the following symptoms: diplopia caused by paralysis of the abducens nerve, headache on the affected side, often complicated by other unquestionably meningitic symptoms. The termination in two cases was death from purulent meningitis. In nineteen cases recovery took place, which did not occur until after weeks' or months' duration, and then spontaneously. Gradenigo believes that this paralysis of the abducens nerve is the result of a meningitis, either purulent or serous in character. In other forms of meningitis, and especially the most frequent form, the tuberculous, abducens paralysis is usually present. It therefore seems that the abducens nerve is unusually vulnerable in basilar meningitis. That may be caused by the relatively small size and length of course of this nerve in the middle cranial fossa, or by the slight power of resistance of the abductors or extensors in general, as is well known in the larynx and in the extremities.

BOENNINGHAUS.

406. HAMMOND draws his conclusions from a study of 50 consecutive cases taken from hospital records during a period extending over six months, all admitted with the distinct diagnosis of acute mastoiditis. The incision of the drum was made in all cases where there was not a good opening. Rest in bed and Leiter coil were first employed. Thirty recovered without operation, 17 were operated on during their stay in the hospital, and 3 were discharged with apparent relief, but returned for operation. Three cases were exacerbations, and 3 with intact drums came to mastoid operation. The average duration of acute inflammation previous to the admission was about six days. Continuous purulent discharge with tenderness and swelling of the mastoid tissues, appearance of slight swelling in the canal, and in one case slight beginning facial paralysis decided the operation. In 4 cases absorption of the inner table and in 1 case an extradural abscess were found. Three cases without mastoid tenderness came to operation. M. TOEPLITZ.

407. A man, aged twenty-nine years, had thirteen years ago a growth removed from behind his ear and auditory canal, which had not returned until two months ago. POOLEY found a large elastic growth situated behind the ear, close to the attachment of, and extending for some distance on, the posterior surface of the auricle, of about the size of a pigeon's egg; also another filling the meatus and extending for some distance into the auditory canal, about the size of an olive. The latter was first dissected out with scissors as far back as possible, followed by considerable hemorrhage. The posterior tumor was fully exposed and found firmly adherent to the concha and posterior auditory canal, which was opened; the two wounds were then connected. After three days another growth was removed from the canal. The posterior wound then broke down and an abscess was collecting from the lobule. Through an incision at the angle of the jaw much pus was removed. The posterior wound continued to suppurate and the auditory canal refilled with tumor and granulations. After another incision and curettement the parts became phlegmonous. Labyrinthine involvement took place. However, treatment by the X-ray improved and finally cured the condition. The pathological diagnosis was fibroma, the clinical one of sarcoma. It was one of those recurring fibroid tumors without well-defined border-line of distinction between malignant and benign.

M. TOEPLITZ.

408. A man of thirty-two suffered from deafness in the right ear. $H = c/36'$. Much cerumen was found and removed. A small white spot was then discovered against the posterior wall of the bony canal just external to the drum, imparting a grating sensation to the probe. It was removed with the alligator forceps and was a pearl button covered with desquamated epithelium.

M. TOEPLITZ.

409. In two cases of chronic purulent otitis media in adults, which had lasted seventeen and six years respectively, a facial paralysis hastened the performance of the radical operation. After removal of carious bone and granulations and a sequestrum over the facial canal in one case, the paralysis was cured.

M. TOEPLITZ.

410. PACKARD emphasizes the following points in the treatment of acute suppurative otitis media: First, the great value of early incision of the membrana tympani, since there was almost instantaneous relief from pain, while after spontaneous rupture the pain continued to be intense for some days in spite of free drainage of the pus. Second, the many advantages possessed by the so-called dry treatment and by practising efficient gauze drainage. Douching out the ear by the patient or the nurse is contra-indicated, since only a skilful aurist can properly dry the ear afterwards.

M. TOEPLITZ.

411. The noses, throats, and ears of 208 patients with typhoid fever were examined on admission and at intervals afterward. Two cases of otitis externa circumscripta, 33 cases of the sound-conducting apparatus, among which 8 of acute catarrhal otitis media and 6 of myringitis. On surveying the literature, acute purulent otitis media was noted; among 780 patients of typhoid fever, in 88 cases (11.3 %), 45 (51.2 %) unilateral (26 left, 19 right), 43 (48.9 %) on both sides. Acute otitis media of typhoid fever is usually monomicrobial, the chronic form is polymicrobial. Pus from the middle ear in 22 cases showed staphylococcus aureus in pure culture four times, streptococcus in pure culture eight times, and these two in mixed infections six times. The pneumococcus was found twice; bacillus diphtheriæ twice. In 7 out of 8 cases of streptococcus in ear pus it was found also in the naso-pharynx. Staphylococcus was here in all 10 cases found in the ear pus. The typhoid bacillus was not found in any case in either the naso-pharynx or the ear discharges. The naso-pharynges of 60 typhoid-fever cases were all found free

from infection with typhoid bacilli. The organisms found in the naso-pharynx were: Streptococcus, staphylococcus aureus, staphylococcus albus, pneumococcus and bacillus diphtheriæ. The two types of cases, the slow and the fulminating, after the end of about a week assumed the same gross pathological state; the difference was the rapidity of onset. In 4 cases of purpuric typhoid fever, the mucosa of the ear was seen to be spotted with blue-black discolorations in 1 case; in another it was slate-colored, blending to brownish-black and black anteriorly. Another case bled freely from the ear. An acute suppurative otitis media followed in all the hemorrhagic cases of whatever form. In 10 cases there was a small-celled infiltration into some of the labyrinthine tissues, in 3 primary, in 4 cases secondary from a necrosis of the inner wall. In 3 cases exuberant granulations pushed the drumhead out without pus, but were associated with dead bone. Two cases had necrosis of the long process of the malleus, 4 cases necrosis in the ossicles, 6 cases in the walls. Among 41 cases of typhoid fever in private rooms only 1 case of otitis media developed. There is a predisposing, if not an exciting factor in typhoid fever, which is not usually present in the first three weeks; 93 % of the purulent otitis media cases occurred after the twenty-first day, 8 % between the twelfth and twentieth days. Of 20 cases of typhoid fever which died before the twenty-first day, no ear suppuration was noted. Of 20 cases that died between the twenty-first and thirty-first days, 2 had suppurating ears. The predisposing causes are: Decubitus, swallowing in recumbent position, acute catarrhal disease in nose and pharynx, lowered resistance, increased virulence of organisms, tubal closure, abnormal patency of tubes, intensity of general infection, former perforation of drum, etc. The exciting causes are: Extension of continuity of disease, infection, thrombus, sloughing of purpuric areas, erysipelas. The symptomatology, diagnosis, prognosis, and treatment are fully considered. As to life, of 88 cases of purulent otitis media in typhoid fever, none was fatal through any complications of the ear condition. Two cases had suppurative involvement of the labyrinth, secondary to the otitis media; panotitis. The only two complications were erysipelas in 3 cases and mastoid empyema in 26 (29.5 %); mastoid tenderness without pus-formation in 31 % of the cases. Every purulent otitis case treated by elevation of the foot of the bed developed mastoid empyema: 4 cases, 1 uni-

lateral, 3 bilateral, with rapid destruction of bone and absolutely normal temperature for a week or more before the operation in 14 out of 26 cases. Where the temperature was high, there was pus in other locations or a re-infection of typhoid.

M. TOEPLITZ.

412. Case 2, in a man, aged thirty years, acute suppurative otitis media; double mastoiditis; operations; recovery. There was a profound septic condition with mental derangement due to absorption from the double mastoid. Case 4, in a man, aged eighty-seven years, acute suppurative otitis media dextra; mastoiditis; epidural abscess; meningitis; operation; death.

M. TOEPLITZ.

b.—CHRONIC MIDDLE-EAR SUPPURATIONS.

413. HEINE. On chronic purulent otitis. *Therapie der Gegenwart*, Oct., 1904.

414. SCHIRMUNSKI. On otolithiasis. *M. f. O.*, 1904, No. 8.

415. KRETSCHMANN. On the occurrence of suppurations in the hypotympanic recess. *A. f. O.*, vol. lxiii., p. 74.

416. JOURDIN. Diseases of the carotid canal and hemorrhages from the internal carotid in caries of the petrous pyramid. *Annales des maladies de l'oreille*, etc., Nov., 1904.

417. BELLIN. A case of hemorrhage from the carotid in tuberculous otitis. *Annales des maladies de l'oreille*, Oct., 1904.

418. FREY. On the new formation of bone in the middle ear in chronic suppurations. *A. f. O.*, vol. lxiii., p. 12.

419. GERBER. The absence of bone formation after operations on the temporal bone. *A. f. O.*, vol. lxiii., p. 134.

420. LUC. Siebenmann's plastic in the radical operation. *Annales des maladies de l'oreille*, etc., Nov., 1904.

421. CABOCHK. On the after-treatment of radical operations with boric acid, and on the resection of the posterior and upper walls of the membranous canal. *Annales des maladies de l'oreille*, etc., July, 1904.

422. KATZ. A case of labyrinth necrosis with sequestration of the entire cochlear plate by operation. *Berl. klin. Wochenschr.*, No. 40, 1904.

423. MCKERNON. A case of chronic purulent otitis media, complicated by chronic mastoiditis and jugular-bulb thrombosis; operation; death. *The Laryngoscope*, Dec., 1904.

424. DENCH. Plastic operations for the closure of the post-aural openings following radical and mastoid operations. *Jour. Am. Med. Assoc.*, Nov. 26, 1904.

425. HEAD. The hot-water douche in the treatment of chronic catarrhal deafness. *Jour. Am. Med. Assoc.*, Nov. 12, 1904.

426. ROY. A case of bilateral tuberculosis of the middle ear in an infant. *Jour. Am. Med. Assoc.*, Nov. 12, 1904.

427. RANDALL. The treatment of otitic septicæmia. *Jour. Am. Med. Assoc.*, Nov. 26, 1904.

413. An article, meant for the general practitioner, on chronic suppurations of the middle ear. HARTMANN.

414. In a girl, twelve years of age, suffering from chronic purulent otitis, a stone measuring $1\frac{1}{4}$ cm long by 1 cm broad and $\frac{1}{2}$ cm thick was found in the external auditory canal, which had probably been formed by a bone sequestration as a nucleus.

PIFFL.

415. In this case of chronic suppuration, disease of the floor of the tympanum resulted from a carious focus in the mastoid process, perforating into the lower part of the tympanum. The carious focus was entirely closed off from the healthy antrum.

HAENEL.

416. A report of fifty cases from literature and two personal observations where the wall of the carotid canal had been destroyed. Of these, forty cases with consecutive hemorrhage from the carotid, which furnishes the basis for an exhaustive article on the pathology and treatment of involvements of the carotid artery and of its bony wall in otitic processes. The most frequent cause is tuberculosis, rarely scarlet-fever, quite unusually lues, cholesteatoma, carcinoma. The symptom of exposure of the carotid canal is an apparent pulsation of the interior tympanic wall, or at least an unusual pulsation of the pus in the tympanum. Dehiscences of the canal would make similar symptoms. The symptom of opening of the carotid is of course a hemorrhage from the ear, more rarely from the nose and from the mouth, finally very severe, usually weak and intermittent at the beginning. In the presence of severe hemorrhage, the erosions of the carotid or of the sinus, usually the lateral sinus, are only to be thought of, of which eighteen cases are known. If the hemorrhage is not severe, as it frequently occurs in otitis with granulations, we should, however, think of the possibility of an erosion of the carotid artery or of the sinus. The treatment is an operative one if the general condition permits of an operation, because without operation death is sure to result. The most rational operation at the present day is the radical operation with or without ligation of

the carotid artery. In JOURDIN's case recovery took place after the radical operation with continued packing of the carotid artery without ligation. It is valuable to know even before operation whether the hemorrhage is taking place from the carotid artery or from the sinus. There are cases where the character of the hemorrhage is not distinctly arterial or venous. These are explained on compression of the vessels of the neck, when the hemorrhage from the carotid becomes feebler, while a hemorrhage from the sinus becomes more severe.

BOENNINGHAUS.

417. A typical case: a phthisical patient in the last stages with old otorrhœa, with repeated but moderate hemorrhages from the ear and mouth. Six weeks after the first hemorrhage, radical operation. In the following six weeks another severe hemorrhage. The internal carotid was ligated. Death from pneumonia. At autopsy perforating tuberculous ulcers at the bend of the carotid artery.

BOENNINGHAUS.

418. In two cases of chronic suppurations and cholesteatoma, extensive formations of exostoses were observed in the lateral surface of the horizontal semicircular canal, and a similar condition was also found in a macerated specimen of the Vienna collection, which presented a large destruction of bone, presumably from cholesteatoma.

HAENEL.

419. The sinus and dura of the middle cranial fossa remained exposed nine months after operation, on account of the wound cavity which was lined with epidermis but without any formation of bone. The observation is illustrated by a drawing.

HAENEL.

420. The external opening of the ear can be permanently enlarged so as to permit a survey of the entire field of operation after the radical operation, by prolonging the section of the membranous canal into the auricle according to Körner or Siebenmann. LUC has operated upon 16 cases with Siebenmann's Y-shaped section, differing, however, from Siebenmann in the following particulars: While Siebenmann incises the posterior auditory canal, Luc cuts through the posterior and upper junction. Siebenmann places both the branches of the Y in the concha in a direction up and back and down and below. Luc places these incisions directly backwards and forwards. Why this section has been modified is not explained, though after Luc's section the natural opening of the concha is more retained.

The author is satisfied with his results, as the dilating of the opening of the ear cannot be regarded as a deformity, perichondritis did not follow resection of the cartilage of the concha, objections which have frequently been made to this procedure. Siebenmann in 197 cases has never observed any unpleasant result from this step.

BOENNINGHAUS.

421. According to CABOCHE, after the radical operation recovery can be accelerated: First, by complete removal of the upper and posterior walls of the membranous canal, including the adjoining part of the concha, whereby the operation is made simpler, the flaps have no tendency to invert, and the opening into the ear is very large. It is important to remove part of the membranous canal at the beginning of the operation. Moure and Delsaux have also given up the formation of flaps. They, however, do not sacrifice so much of the membranous wall. Second, by daily insufflations of boric acid after the packing has been removed on the fourth day, according to the suggestions of Delsaux and Lermoyez. The reviewer can also recommend this form of after-treatment, because it is less irritating and makes the patient more independent of the physician.

BOENNINGHAUS.

422. A locksmith, twenty-four years of age, was operated upon on account of a chronic suppurative otitis of the right side (perforation of Shrapnell's membrane) with severe labyrinth symptoms (one-sided deafness, vertigo, vomiting, facial paralysis, fever, no subjective noises). Shortly after operation, the vomiting, vertigo, and facial paralysis disappeared. In the course of the after-treatment, a sequestrum was found in the depth of the middle ear. As the sequestrum did not spontaneously separate, a second operation was performed to remove the surrounding part of the bone, and after a few days the sequestrum could be removed with a forceps. It contained the cochlea. Rapid recovery.

MÜLLER (Stuttgart).

423. A boy, aged five years, had scarlet-fever seven months prior to his first presentation, with pain behind both ears during the first week, followed by bilateral otorrhœa, continuing profusely for six weeks, when the left ear ceased to discharge and had remained well. The right ear discharged intermittently ever since. During the cessation of the discharge of this ear the child was fretful, drowsy, constipated, had headaches, pain, and foul odor from breath; when the discharge set in again, the train

of symptoms cleared up. The right external meatus was filled with thick, foul-smelling pus. There was a double perforation of the drum, granulations sprouted through the upper opening, and on probing roughened bone was felt at two points. Examination of smears revealed mixed infection, with staphylococcus predominantly. An operation for the intratympanic caries was declined. After palliative treatment for one month, the boy was reported to have been apparently cured, but a month later the lower perforation had closed, the upper posterior still contained granulations, but somewhat contracted, and there was a slight thin discharge for three days. Three months later the discharge was much thicker, very offensive, darker, and quite profuse. The color of the boy was bad, the general condition impaired. The operation was consented to. Radical operation. Pus in antrum, tip, zygomatic root, and medullary spaces posterior to sigmoid groove. Bone between posterior canal wall, anterior surface of sigmoid groove, and downward to bulb soft and necrotic. Cheesy material, cholesteatoma, removed from epitympanic space. Skin graft over the entire middle ear and mastoid antrum. Posterior wound left open. For eight days the boy was doing well. On the morning of the eighth day, headache, photophobia, restlessness. Temperature 104.0°F. Vomiting. For the next seven days no change of condition; wound looked well. On the eighth day following the rise of temperature, drowsiness and irritability, pulse more rapid, pain in back of head and neck. Temperature 104.8°; pulse 130, weak and irregular. Exploratory operation: The bone covering the sigmoid sinus was removed from above the bend of the sinus to the jugular bulb. The bone was found softened below, and on removal a small cell filled with cheesy material, cholesteatoma. The dura of the sinus was dark, with lustre and easily compressed. On incision no blood issued, but a clot, nearly an inch long was removed from the torcular end; it was soft, gelatinous, with grayish particles of plastic material adherent to its surface. Free hemorrhage was established. Several pieces of clot of firmer consistency were removed from the bulb, but there was no blood current below. The internal jugular vein was ligated and resected. Several enlarged lymphatic glands were removed from the upper third. A hot saline injection was made into the bowels. The boy never regained consciousness, and died twenty-four hours after the operation, the temperature remaining stationary up to the time of death. No autopsy.

M. TOEPLITZ.

424. DENCH cuts a large tongue-shaped flap from the concha, dissecting out the cartilage, turning the tongue of integument upward and backward into the posterior opening and securing it in place by sutures. He then makes an incision from the upper margin of the posterior opening just behind the line of auricular attachment. The integument is then dissected up from the underlying soft tissues, forward over the posterior surface of the auricle, and backward over the skull for a considerable distance throughout the entire extent of the opening which it was desired to close. From the lower border of the original post-aural fistula two slightly divergent incisions were made down the neck, a tongue-shaped flap to be folded upward into the wound and attached anteriorly to the periosteum of the bony cavity of the mastoid. The margins of the wound of the neck were undermined and drawn together. In another case four flaps were formed: a tongue-shaped one, from the auricle turned upward and backward, another from the upper margin of the opening upward, a third in line of the auricular attachment downward from the lower margin, and a fourth from the posterior margin well inside to avoid the dura.

M. TOEPLITZ.

425. A number of patients have shown decided improvement in hearing and relief of tinnitus on using the hot douche, which is applied by means of the fountain syringe through a specially small tip or a straight glass medicine dropper, hung eighteen inches above the ear, the water being as hot as can be borne without burning.

M. TOEPLITZ.

426. A baby, six months old, suffered with a discharge from both ears. The mother had a line of tuberculous ancestors. The discharge from the left ear was offensive and two-thirds of the canal were filled with granulation tissue. The discharge from the right ear was slight, but purulent and offensive, and the canal contained granulation tissue. Slight signs of facial paralysis were on the left side. Discharge and granulations showed a large number of tubercle bacilli. In lungs, râles. The granulations were removed, but sprouted again. The baby died of tuberculous bronchitis.

M. TOEPLITZ.

427. In cases of tympanic involvement with a septic character, RANDALL urges, besides local treatment, general measures, especially the frequent and full employment of enteroclysis.

M. TOEPLITZ.

C.—CEREBRAL COMPLICATIONS.

428. ESPENSCHIED. On the relation between caries of the petrous pyramid and optic neuritis. *A. f. O.*, vol. lxiii., p. 1.
429. TENZER. On the condition of the eye-grounds in diseases of the ear. *A. f. O.*, vol. lxiii., p. 23.
430. STRATEJEWSKI. A case of brain abscess. *Chirurgja*, vol. xv., No. 89.
431. ALT. Two healed cases of cerebellar abscess. *M. f. O.*, 1904, No. 7.
432. RICHTER. Gangrenous pachymeningitis, and hydrogen peroxide to show the presence of blood. *M. f. O.*, 1904, No. 7.
433. MANASSE. On the operative treatment of otitic meningitis. *Zeitschr. für klin. Medizin*, 55 Band.
434. LERMOYER and BELLIN. On the surgical treatment of generalized purulent otitic meningitis. *Ann. des mal. de l'oreille*, etc., Oct., 1904.
435. TAPTAS. A case of thrombophlebitis of the lateral sinus. *Ann. des mal. de l'oreille*, etc., 1904.
436. BACON. A case of sigmoid sinus thrombosis; operation without ligation of the internal jugular vein; recovery. *N. Y. Med. Jour.*, and *Phila. Med. Jour.*, Oct. 1, 1904.
437. BALL. Thrombosis of the lateral sinus following acute otitis media. *Amer. Medicine*, Sept. 17, 1904.

428. In the ear clinic in Tübingen, seventy-four cases of caries of the petrous pyramid were observed, in which a choked disk was present in two and neuritis optica in one. The author concludes as follows: hyperæmia of the optic nerves forms no indication for operation on the mastoid process, as in certain cases the condition disappears without operation. Pronounced optic neuritis or choked disk is only observed in severe cases, when operation must be undertaken on account of other threatening symptoms. The communication between the ear and the eye conditions occurs through the cerebral lymph, which receives the poisonous material from the purulent focus in the petrous bone, acts in an inflammatory manner on the papillæ, and causes a swelling on account of its increased tension. In the fatal cases, a bacterial leptomeningitis is usually the intervening condition. Though the affection of the optic nerve disappears after the healing of the focus in the temporal bone, the continued presence, increase, or even development of disease of the optic nerve does not of itself furnish an indication for a new operation, because these conditions are observed even when the course of the disease is favorable.

HAENEL.

429. TENZER has observed the material of the Charité Ear Clinic in Berlin during the last ten years as to the condition of the eye-grounds. In the frequent simple affections of the middle ear and of the mastoid process without intracranial complications, changes in the eye-grounds, usually of a mild character, were observed in only 5. Of the 7 cases with clinical symptoms of an intracranial disease without any evident anatomic condition (serous meningitis), 6 showed changes in the eye-grounds, and of these, in 5 optic neuritis or choked disk was present. In 76 cases where intracranial complications were added to the ear condition, as was shown by operation or autopsy, the following table shows that in 12 cases complicated with cerebellar abscesses changes in the eye-grounds were found present in 9. In 14 cases with cerebral abscesses, changes were observed in 7; in 31 cases of purulent meningitis, in 11; in 19 cases of extradural abscesses, in 5; and in 35 cases of sinus thrombosis, in 9. Intracranial complications of every kind and description may be present without producing changes in the eye-grounds—in fact a normal eye-ground is more frequent. The ophthalmoscopic condition does not enable us to conclude on the kind of intracranial disease. The eye-ground changes may appear at any time—as early symptoms before the onset of clinical symptoms, at the acme of the disease, and finally before the removal of the focus by operation. The changes of the eye-grounds are usually doubled-sided, though they may sometimes be limited to one side and that the unaffected side. The course and termination cannot be prognosticated from the condition of the eye-grounds.

HAENEL.

430. A woman, forty-two years of age, was operated upon who had been taken ill, after an otitis, with violent symptoms of a brain abscess. After operation, an improvement, which lasted for four days. Then suddenly her condition grew worse, with fever, unconsciousness, and death after a few days. No autopsy.

SACHER.

431. Of these two very interesting cases which were healed by operation, the first was that of a man, thirty-one years of age, with chronic purulent otitis and cholesteatoma, who had suffered from headache and fever but without any symptoms pointing to an affection of the cerebellum. A necrotic area of bone situated posteriorly to the sigmoid sinus led to the diseased dura and the exposed cerebellar brain substance, which was eroded to the depth of $\frac{1}{4}$ cm.

The second case was a man, seventy years of age, who was taken ill with acute purulent otitis, vertigo, and headache. At operation, at the inner side of the sinus there was a fistula in the dura, which led to an abscess as large as a walnut. The examination of the eyes in the first case showed choked disk, in the second normal condition but with horizontal nystagmus.

PIFFL.

432. Within an interval of from two to three days a young man, seventeen years of age, suffering from chronic purulent otitis developed very threatening and unusual symptoms. There were an abscess of the right half of the head, extending from the auricle to the medial line of the occiput, two abscesses in the auricle, an abscess in the neck down to the sternum, and pachymeningitis which extended to nearly the depth of the petrous pyramid, where the dura was of a greenish-brown color and separated from the bone. After extensive opening of the abscess and exposure of the dura, the process was brought to a standstill and the case recovered. The author is inclined to regard hydrogen peroxide as of service in showing the presence of blood.

PIFFL.

433. Two cases of meningitis healed by operation are reported.

1. A man, forty years of age, with chronic suppuration presented symptoms of brain irritation. At operation an extradural abscess was found in the posterior cranial fossa. Notwithstanding evacuation of this abscess, the symptoms grew worse—four days later, distinct meningitis, fever, rigidity of the neck, tension of pulse, complete coma. Puncture of the meningeal sac through the exposed dura evacuated a large quantity of clouded, serous, yellowish fluid. Repeated punctures evacuated about 15ccm. Microscopic examination of the fluid revealed pus corpuscles, diplococci, and bacteria coli. Improvement on the following day. Continued escape of cerebro-spinal fluid. Punctures were repeated with the same result. The dura was incised. Continuous escape of cerebro-spinal fluid with improvement. On the third day, return to consciousness, pulse and temperature became normal, and the rigidity of the neck disappeared. Recovery.

2. A girl, eleven years of age, was operated on for a thrombosis of the lateral sinus and jugular bulb after acute suppuration. After operation, gradual onset of symptoms indicating

intracranial complications, fever, restlessness, headache, increased reflexes, somnolence, and optic neuritis. Puncture of the cerebellum showed increase of cerebro-spinal fluid. In the clear fluid there were flocculæ which proved on examination to consist of brain debris. Then immediate improvement. On the following day repetition of the puncture. Recovery.

The case, according to the author, is regarded as one of serous meningitis with encephalitis. The latter diagnosis is based on the microscopic presence of brain tissue.

In another case, the symptoms of meningitis, rigidity of the neck, somnolence, disappeared after the radical operation, with a disintegrated cholesteatoma but with normal dura.

Following these observations, MANASSE recommends in the presence of symptoms of meningitis the first operation on the temporal bone including complications. If the symptoms continue, puncture of the meningeal sac through the exposed dura should be made, if successful to be repeated daily. If this does not succeed, the dura is to be broadly opened. Finally this step can be combined with lumbar puncture. HOELSCHER.

434. An otitic meningitis. The source of infection should be excluded by the radical operation and the dura extensively exposed. If this simple step is unsuccessful, the dura and the arachnoid should be incised and lumbar puncture repeatedly made. The authors recommend this active procedure because they have observed two successful cases of meningitis which were treated in this manner. The authors, however, are not correct in regarding these cases as purulent, or as generalized purulent, meningitis. For even if the lumbar-puncture fluid is purulent or clouded through by leucocytes, this sediment of the subarachnoid fluid in the lowest part of the lumbar sac does not prove that the fluid in the spinal subarachnoid spaces is purulent. It may be only sero-purulent or serous, and the second case (purulent lumbar fluid on escape of fluid after incision of the dura and puncture of the brain, existing under pressure) appears to be a case of serous ventricular meningitis.

BOENNINGHAUS.

435. A very interesting case. An old suppuration; headache for ten days, vertigo, vomiting, fever with sudden fall. Radical operation: cholesteatoma; the wall of the sinus and surrounding dura discolored; sinus flattened and empty, the jugular vein nevertheless ligated; the sinus broadly opened; with curette

blood coagula are removed from above and below, followed by hemorrhage; no improvement. Three days later, broad crucial incision in the cerebellar dura mater. Immediate prolapse of brain with puncture negative, immediate beginning of convalescence. The case demands a different explanation. The strong intracranial pressure, which was not regarded by the author, proven by the compression of the sinus and the immediate prolapse of the brain after incision of the dura, can only be regarded as acute serous meningitis. From the fact that convalescence immediately began after incision of the dura, and as no serum escaped externally, the case was probably one of an acute inflammatory hydrocephalus of the ventricles, where the fluid escaped in the subarachnoid cavity after the prolapse had furnished more room within the skull (see my monograph on *Acute Serous Meningitis*, Wiesbaden, 1897, pp. 67 and 91). The blood coagula were not red, consequently not inflammatory thrombi, and resulted from the stasis in the neighborhood of the bulb and of the torcular.

BOENNINGHAUS.

436. A woman, thirty-three years of age, had four years ago been successfully operated upon for an acute mastoiditis of the right ear due to influenza. The present trouble was an acute mastoiditis of the left side, for which she was also operated upon. A perforation was found in the bone filled with pus. The sigmoid sinus was covered with granulations, the sinus wall found healthy, but was accidentally injured. Owing to septic temperatures the sinus was again exposed ten days after the mastoid operation and found closed in lower portion from a thrombus forming at the bulb. The return flow of blood was restored by the curette.

Recovery.

M. TOEPLITZ.

437. A debilitated woman, aged twenty-eight years, was seized with an exudative streptococcus tonsillitis, the exudate white, mushy. A week later an acute otitis media set in in the left ear. An incision of the drum was followed by suppuration with streptococci. Intermittent temperatures continued. Another incision was made, tenderness over the mastoid was felt, but the operation was delayed. A few days later swelling behind the auricle appeared with increase of temperature, severe chill, and fall of temperature from 106° to 100°F. The mastoid was opened, a few cells found diseased, but the sinus was not exposed. After twenty-four hours, another chill, lasting fifteen minutes, occurred, with temperature 107°, falling to 98.4°; pulse

114. On the third day, another chill. On the fourth day, the sinus was explored, a broken-down, soft, purulent clot was found, and one drachm of pus escaped. No flow was established from below. On the following day, slight chill; pulse 130. On the next day chill, lasting forty minutes; temperature 105°, pulse 160. Ligation of jugular, which did not contain any thrombus. The temperature continued a septic course. The left elbow joint was swollen. Death ensued after six days, three weeks after the onset of the otitis media. M. TOEPLITZ.

NERVOUS APPARATUS.

438. DAVIDSON and WESTHEIMER. On a case of tabes with involvement of the larynx and of the labyrinth. *Deutsche med. Wochenschr.*, No. 47, 1904.

439. HOLSCHER. On Ménière's symptom-complex. *Med. Cor.-Bl. d. Württ. ärztl. Landesvereins*, 1904, No. 34.

438. A waiter, forty-two years of age, who suffered from tabes, exhibited for a number of years the symptoms of tabes, consisting in gastric crises, continuous hoarseness, and gradually progressive deafness. The hearing in the diseased ear is now completely extinguished. The deep tuning-forks were not perceived at all by air-conduction; f⁴ sharp was only heard for a very short time and as well with the ear closed as open; C was not perceived from the left mastoid process, but was heard from the forehead and vertex. The author concludes that this deafness was due to disease of the labyrinth, as has already been described by other authors. NOLTENIUS.

439. A typical case in an officer twenty-nine years of age. Apoplectiform onset. General improvement with subcutaneous injection of pilocarpin, hot baths, wet packs, iodid of potash, and gray ointment. The treatment had not been concluded at the time of publication. MÜLLER.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

440. GLAS. On intra-epithelial glands, cysts, and groups of leucocytes in the human nasal mucus. *Arch. f. Laryngologie*, vol. xvi., No. 20.

441. LERMOYEZ. The functional insufficiency of nasal respiration and education for nasal respiration. *Ann. des mal. de l'oreille*, 1904, Sept.

440. The author has examined 120 tumors, polypi, and turbinal hypertrophies of the nasal mucosa for the presence of intra-epithelial glands. The specimens were obtained in the University clinic of Professor Chiari. In twelve cases typical intra-epithelial glands were found, in accordance with Zarniko and Boenninghaus and opposed to the negative findings of Cordes. The condition is defined and the results are described.

ALBANUS.

441. The author had previously published a case of an hysterical patient where it had been impossible to breathe through a normal nose because the patient said it was impossible. Another case is now described in a young girl twenty-one years of age, not hysterical, where this impossibility of breathing through the nose consisted in the faculty of breathing having been lost after a protracted coryza. Systematic exercises in breathing with closed mouth resulted in recovery after four brief sessions. The author thinks that these exercises should also be followed by children who, after pharyngeal tonsils have been removed, do not breathe properly notwithstanding an unimpeded nose; that thereby more will be accomplished than by the usual advice of the parents to keep the mouth shut, and the wearing of a mouth-bandage during the night.

BOENNINGHAUS.

b.—OZÆNA.

442. TREITEL. At what age does ozæna first show itself? *Arch. f. Laryngol.*, vol. xvi.

443. BOBONE. Petroleum in the treatment of ozæna. *Arch. internat. d'otol.*, etc., vol. xviii., p. 890.

442. The literature is first reviewed. The author has observed ozæna in a child four years of age, and in a brother and sister of six and eight years of age respectively, whose mother also suffered from ozæna. The mother declares that her father had suffered from a similar trouble.

ALBANUS.

443. The application of petroleum on account of its bactericidal and stimulating effects is recommended as a curative agent against ozæna. The number of cases which have been treated is not given. The patients who had been released from treatment had to continue the applications, and as these patients did not again call upon the physician, the author draws the rather questionable conclusion that these patients, at least the majority of them, were definitely cured.

OPPIKOFER.

c.—TUMORS.

444. LERMOYEZ. Nasal tumors from Penghawar. *Ann. des mal. de l'or.*, etc., 1904, April.

445. RÖPKE. On endothelioma of the nasal cavity. *Münch. med. Wochenschr.*, No. 33, 1904.

446. LERMOYEZ. A case of carcinoma of the ethmoid bone. *Ann. des mal. de l'or.*, etc., 1904, July.

444. After nasal operations, LERMOYEZ is in the habit of introducing Penghawar fibres into the nose to arrest the hemorrhage, because they can be introduced without pain and are easier to remove than gauze plugs. He, however, has observed that after their use small granuloma, as large as beans, consisting of giant cells, developed at the site of operation, which evidently were due to some Penghawar fibres which remained in the nose and were surrounded by granulation tissue.

BOENNINGHAUS.

445. RÖPKE reports a case which he has observed, and, after reviewing previously published observations, concludes that endothelioma of the nasal cavities furnishes a bad prognosis. The patients can, if they come early enough to operation, in favorable cases, survive for a shorter or a longer length of time. It is difficult to prevent recurrences, owing to the extensive and inaccessible system of cavities in the nose and its accessory cavities. The most usual termination is death, following perforation of the tumor into the cranial cavity.

HARTMANN.

446. By the only suitable method of broad exposure from the outside, the author removed a large carcinoma of the left ethmoid bone in a man forty-three years of age. The operation consisted in a cutaneous incision along the side of the nose, then a resection of the frontal process of the maxilla and of the nasal wall of the orbit. The tumor was situated favorably, inasmuch as the bony walls of the nasal cavity, especially the lamina cribrosa, which is usually invaded early, were intact. Though no relapse occurred within one and a quarter years, a definite recovery cannot be concluded, but it is nevertheless a very favorable result, notwithstanding the usually bad prognosis in these very malignant tumors.

BOENNINGHAUS.

d.—DISEASES OF THE ACCESSORY SINUSES.

447. HENRICI and HÄFFNER. Do suppurations of the accessory nasal cavities produce a contraction of the visual field? *Münch. med. Wochenschr.*, No. 49, 1904.

448. FRIEDRICH. The diagnosis and treatment of suppurations of the maxillary antrum. *Deutsche med. Wochenschr.*, No. 50, 1904.
 449. LAURENS. Surgery of the frontal sinus. *Ann. des mal. de l'or.*, etc., 1904, June.
 450. TAPTAS. My method of operating radically on the frontal sinus. *Ann. des mal. de l'or.*, etc., 1904., Sept.
 451. GERBER. Rhinogenic cerebral abscess. *Arch. f. Laryngol.*, vol. xvi., 1904.

447. Of 37 patients with disease of the accessory cavities of the nose, 36 showed a normal visual field. The contraction was found in one case, which was not certain. SCHEIBE.

448. This is a clinical discourse on the diagnosis and treatment of empyema of the maxillary antrum. No new view-points are furnished. On two points, however, the author seems to have an opinion which varies from the usual one: first, he does not employ the diagnostic puncture of the Highmore cavity with aspiration of the fluid, and, secondly, it would seem in most cases impossible to thoroughly eradicate the diseased ethmoid cells from the maxillary antrum which is wide open. In these cases the ethmoid labyrinth should be broadly opened by an operation from the outside. NOLTENIUS.

449. Based on seventy-one operations, the author relates his experiences in the surgery of the frontal sinus. 1. In uncomplicated cases he operates according to Luc-Ogston: incision in the eyebrow, opening in the area of disease, *i. e.*, above and to the side of the nose. Curettage of the cavity, especially of the nasofrontal duct. If the sinus be large, another small opening is made, up and externally from the first, in the roof of the orbit. This latter opening is made also in those cases where the sinus is not found from the first opening. Forty cures are reported from this simple and non-deforming method. 2. In complicated cases, *i. e.*, when the walls of the sinus are diseased, when other complications are present, or when after method 1 no healing takes place, the so-called sinusotomy is made, consisting in the removal of the entire anterior and lower wall of the sinus, to obliterate the sinus, just as Killian does, except that the orbital ridge is included. Twenty-nine recoveries are reported; two deaths from meningitis and cerebral abscess. This operation gives a poorer cosmetic result than Killian's method. It is, however, easier to perform and seems to be always successful.

BOENNINGHAUS.

450. The principle is the same as the radical operation of Killian, which is now practised universally in Germany. A broad opening is made between the nose and the frontal sinus. This is obtained just as Killian does, by resection of the frontal process of the superior maxilla, together with the anterior ethmoid cells, including the middle turbinal. With right the author claims priority for this part of the operation. Obliteration of the cavity is obtained just as by Killian, whose method, however, is unknown to the author, by total resection of the anterior wall. TAPTAS preserves the floor of the frontal sinus, which Killian removes, and does not preserve the supraorbital ridge. Twelve cases were healed without any degree of deformity. The certainty of recovery seems to be the same in this method as his. If we except the similar cosmetic result, which can be obtained in any case by the use of paraffin, Kuhnt-Taptas's radical operation is easier to perform than the Killian-Taptas operation. The question, however, remains, whether an obliteration in the ordinary cases without caries is necessary, and whether in the turbinal sinus, just as in the antrum of Highmore, a simple curetting after a broad communication with the nose—in other words, a Luc-Ogston-Taptas operation—is not sufficient. BOENNINGHAUS.

451. After influenza an empyema of the left frontal sinus. The mucous membrane was found degenerated and polypoid; pus. After operation the symptoms were all relieved. Two weeks later a painful swelling over the right frontal sinus. Temperature 38.9° C. On examining the nose there was no pus. One week later, operation on the right frontal sinus, whose anterior bony wall was found necrotic to a considerable extent. The sequestra, consisting of this anterior wall, the degenerated mucous membrane, and the carious frontal septum, were removed. Moderate quantity of pus. Frontal ethmoidal cells filled with pus were exposed. After several days, again a rise of temperature. A third operation. Exposure and eradication of the temporal recesses of the cavity. Softened posterior wall of the right frontal sinus was curetted with a sharp spoon. Pus appeared from the depth. The discolored dura was exposed. After incision the brain was punctured without result. At first, improvement, then headache, with slow pulse. The brain was again explored, and an abscess in the frontal lobe of the brain was evacuated. Death after four days. The author believes that the cause for this intracranial extension is to be found in the fact

that the empyema in the left frontal sinus was closed off. Bacteriological examination showed staphylococci and streptococci.

ALBANUS.

c.—OTHER DISEASES OF THE NOSE.

452. BLOEBAUM. The radical treatment of rhinophyma with galvano-caustic. *Munch. med. Wochenschr.*, 1904, No. 52.

453. LUBLINSKI. Accidental vaccination of the nasal mucosa. *Munch. med. Wochenschr.*, 1904, No. 52.

454. JAURASZ. Some rare and remarkable affections of the upper respiratory organs. *Arch. f. Laryngol.*, vol. xvi., 1904.

455. LOMBARD and BOURGEOIS. A modification of the submucous resection of the septum of the nose, after Petersen. *Ann. des mal. de l'or.*, etc., Oct., 1904.

452. The tumors were removed with the galvano-cautery snare and knife, the parts which were not thickened were punctured, and all unevenness smoothed with the flat burner. The after-treatment was continued for four weeks. The photographs of the case before and after operation show a very good result, although of course the form but not the color is given.

SCHEIBE.

453. A woman, who had not been revaccinated and who had frequently suffered from epistaxis, made use of a pocket-handkerchief with which she had dried the vaccine pustule of her child. Two pustules appeared on the lower and anterior extremity of the septum. The course was an eventful one. Three cases of vaccine pustules on the nose have been reported up to the present time.

SCHEIBE.

454. 1. In a patient, fifty-seven years of age, who had applied for treatment on account of a moderate nasal occlusion, a fully developed supernumerary eye-tooth was found protruding from the floor of the nose. It was easily removed.

2. A girl, fifteen years of age, suffered from moderate difficulty in swallowing and the sensation of a foreign body in the throat. A pedunculated smooth, thick polyp hung down beyond the soft palate from the naso-pharynx down to the region of the epiglottis. The insertion was near the pharyngeal tonsil. Microscopic examination of the removed part revealed that the tumor was composed of the lymphatic tissue of the pharyngeal tonsil.

3. A woman, twenty-nine years of age, in the last month of pregnancy, experienced slight difficulty in swallowing, but without fever; grayish-white pseudo-membrane on the surface of the

entire naso-pharynx. Nose, throat, and larynx were normal. The membrane contained diphtheria bacilli in pure culture. This case was similar to the way in which fibrinous or croupous rhinitis occurs in the nose. After a short time it was found to have disappeared without leaving any trace.

ALBANUS.

455. The authors operate under an adrenalin anæmia in chloroform narcosis. This is not necessary, because an anæsthesia composed of cocaine and adrenalin is sufficient. If the osseous septum has to be resected, the connection between the vomer and the floor of the nose is first destroyed, and then the vomer is broken off with the forceps. The chisel, which complicates the operation, can generally be dispensed with, as the forceps are sufficient. The authors in general endeavor to retain the mucous membrane on the convex surface. That is perfectly natural nowadays with the aid of adrenalin. The mucous membrane can be sacrificed if it is found that its separation is difficult—for instance, in the presence of sharp edges, scars, and adhesions. This standpoint is correct; then the loss of the flap has the only disadvantage of prolonging the recovery, but does not lead to any permanent untoward effect. The operation should not be called Petersen's, but more properly Hartmann-Petersen's.

BOENNINGHAUS.

f.—NASO-PHARYNX.

456. DELSAUX. Adenoid vegetations and contra-respirators. *La presse oto-lar. belge*, 1904, book ii.

457. EERRERI. On post-operative torticollis in adenoid patients. *Arch. internat. d'otol.*, etc., vol. xviii., p. 744.

458. LUNIN. A tumor of the naso-pharynx. *Protokolle des deutsch. ärztl. Vereins zu St. Petersburg, Sitzung am 8 März, 1904.*

459. WOLYNZEW. On operative treatment in opening the naso-pharynx with rhinotomy and resection. A new procedure to open into the naso-pharynx. *Chirurgija*, vol. xiv., No. 84.

456. The result of the not infrequent relapses after the removal of adenoids is due, according to the author, to a neglect of the after-treatment from the side of the nose. The nasal cavities are to be treated for the space of several months. The ventilation of the nose and restoration of the nasal respiration are often due to a poorly fitting mouth obturator. In every case the author has an obturator made from an exact impression of the

teeth, so that it fits just as exactly as a set of false teeth. Twice a day after the obturator has been inserted, exercises in nasal respiration are followed. Under this treatment the chronic cold in the head rapidly gets well.

BRANDT.

457. The author observed torticollis in two children after Gottstein's operation, which disappeared after one week in both cases. The lymph vessels passing from the pharyngeal tonsil communicated to a certain degree with the lymph nets situated underneath the sterno-mastoid muscles. If this deep-seated set of vessels is infected, the inflammation extends to the muscles, which then contract.

OPPIKOFER.

458. The specimen of a tumor of the naso-pharynx described was obtained at the autopsy of a boy four years of age. The boy had only been ill one and a half months. He presented on admission to the hospital all the symptoms of a malignant tumor of the naso-pharynx: rapid growth, loss of nasal respiration, dislocation of the soft palate forward and under, enlargement of the neck glands, and affection of the general system. The tumor originated from the base of the skull and occupied the entire naso-pharynx. It is of interest in this case to say that though the clinical picture undoubtedly was that of a malignant tumor the microscopic examination with certainty denied the malignancy of the tumor.

SACHER.

459. WOLYNZEW resects the superior maxilla on the opposite side to the diseased part of the naso-pharynx and recommends the operation as furnishing an extended field of operation. Resection of the upper jaw is practised by an incision which passes along the right of the nose and divides the upper lip in the median line. The resection is performed with the Gigli saw.

SACHER.

PHARYNX AND MOUTH.

460. FINDER. A peculiar condition of the posterior pharyngeal wall. *Arch. f. Laryngol.*, vol. xvi., 1904.

461. ONODI and ENTZ. On keratosis pharyngis. *Ibid.*, vol. xvi., 1904.

462. SACK. A severe case of mixed infection in the pharynx. *M. f. O.*, 1904, No. 8.

463. KLUG. Retro-pharyngeal abscess; erosion of the carotid artery; death. *Annales des maladies de l'oreille*, etc., 1904, Juli.

464. GURICH. On the relation between affections of the tonsils and rheumatism. *Münchn. med. Wochenschr.*, 1904, No. 47.

465. KÖNZEL. Purulent peritonitis following acute tonsillitis. *Ibid.*, 1904, No 43.

460. A patient, forty-five years of age, who was being treated on account of asthma and hoarseness, presented on his posterior pharyngeal wall very many pointed, yellowish-white nodules which protruded beyond the level of the mucous membrane. The intervening part of the mucous membrane was smooth, thin, pale, and dry. The condition continued towards the nasopharynx and increased in the direction of the larynx. No symptoms. No inflammatory signs. The microscope revealed that these nodules consisted of round and oval structures whose nature could not be determined. They gave the impression of being the product of some unknown retrogressive metamorphosis. A colored plate accompanies the article. ALBANUS.

461. This disease consists in a thickening and keratosis of the epithelium—in other words, a metaplasia accompanied with moderate inflammation of the connective tissue. The keratosis of the epithelium is not produced by keratohyalin or eleidin granules. The brownish discoloration of the epithelial plugs is partly from the original yellowish-brown color of the horny substance and partly from blood extravasates which are situated between the layers of epithelium. The disease develops upon a chronically inflamed base. The presence of leptothrix is purely accidental. It is in no relation with the disease. The authors suggest abandoning the word pharyngomycosis and prefer the term keratosis pharyngis for the milder cases; in the severe cases with prickly cells, the term suggested by Siebenmann, hyperkeratosis pharyngis. ALBANUS.

462. A child who had become infected with lues by the wet-nurse was taken ill in the eighth year with deep ulcerations in the left tonsil, the uvula, the palatal arches, and the posterior pharyngeal wall. Bacteriological examination revealed Vincent's bacilli, hence the diagnosis of angina ulcerosa. As every treatment was without result, mercury was administered and immediate improvement began. The authors, therefore, are inclined to regard this case as one of a mixed infection. PIFFL.

463. A child, suffering from a left-sided otorrhœa with mastoid fistula, suffered, after an attack of scarlet-fever, with a retropharyngeal abscess, which was incised. On the following day the child bled to death from the mouth. At autopsy, in the abscess cavity, which extended over the left half of the neck between the base of the skull and the hyoid bone, the carotid was found exposed and eroded. In the left middle ear there was a sequestrum

which contained the outer wall of the carotid canal. The supposition of KLUG that the abscess was a gravitation abscess from this bone focus seems probable. Perhaps the microscope might have shown both processes to be tuberculous in nature, inasmuch as there was a general acute miliary tuberculosis. The supposition, however, is not probable because (1) a detailed examination of the temporal bone was not made, which would have shown a connection between the ear and the abscess, and (2) the glands of the neck and of the axilla were very much swollen from the scarlet-fever, so that the abscess may have been the ordinary postscarlatinal phlegmon of the neck. BOENNINGHAUS.

464. Of 17 cases of acute articular rheumatism, 12 developed inflammation of the tonsils, 4 of these with peritonsillar abscesses. In 14 of these cases tonsillar plugs could be observed. The author recommends treating relapsing articular rheumatism with removal of the tonsillar plugs and reports favorable results in a few cases. SCHEIBE.

465. At autopsy, in addition to peritonitis, both tonsils were found as large as walnuts, pale grayish-red in sections, with granular surface. The peritoneal exudate as well as the tonsillar gave a pure culture of streptococci, while the bacterium coli was found in the appendix, the tube, and the uterus, and bacilli of various kinds in the intestines. SCHEIBE.

BOOK REVIEWS.

III.—**Coakley's Laryngology.** A Manual of Diseases of the Nose and Throat, by C. G. COAKLEY, Professor of Laryngology in the University and Bellevue Hospital College. New (3d) Edition. 12mo. pp. 594. Cloth \$2.75 net. Lea Brothers & Company, Philadelphia. 1905.

The preface to this new (3d) edition states that Chapter VII. on Diseases of the Accessory Sinuses has been entirely rewritten. We find that it now occupies fifty pages, and that this important subject is presented in a very clear and practical manner. According to Dr. Coakley, transillumination is a valuable aid in diagnosis, but not infallible. The value of a skiagraph for showing the presence and outline of a frontal sinus is mentioned. In the operative treatment of chronic suppuration of the maxillary and frontal sinuses we must differ with the author in a number of particulars. The only operation described consists in the total removal of the anterior or external wall of the sinus, complete eradication of the mucous membrane, then attempting to get total obliteration of the cavity by the formation of granulations. No mention is made of the impossibility of obtaining total obliteration of a bony-walled cavity by granulations in many cases, granting that obliteration is essential, which is still an open question, and no account is taken of the subsequent deformity which would result in the case of the frontal sinus. We have in the Caldwell-Luc operation for the maxillary sinus, and the Jansen, Kuhnt, or their combination, the Killian operation for the frontal sinus methods, which are much better and nearly ideal.

We are quite certain that this part of the book will again be rewritten for the next edition.

A. K.

Die Ohrenheilkunde der Gegenwart und ihre Grenzgebiete (Modern Otology), appearing in the form of Monographs,

edited by Professor O. KOERNER and published by J. T. Bergmann, Wiesbaden, has received the following three accessions during the past year:

IV. **Die Otosclerose** (Sclerosis) by Professor A. DENKER, Erlangen. 1905.

This monograph of 135 pages gives a careful review of our present knowledge of this interesting, though from a therapeutic standpoint most unsatisfactory, disease. In the introduction, otosclerosis is defined as a disease-entity, where, with a patent Eustachian tube and normal drum, clinically there is progressive deafness, and the functional examination shows definite and characteristic peculiarities. The pathological changes consist in a bony ankylosis of the stapes and rarefaction of the bony labyrinth capsule.

This affection includes only the primary forms of labyrinth involvement, agreeing with the teachings of Bezold, as opposed to the forms secondary to chronic middle-ear affections.

After introductory chapters on the normal anatomy and physiology of the parts involved, nearly half of the book is devoted to a description of the pathological changes. The cases in which the diagnosis was made *intra vitam* and later were examined with the microscope number 27, and are reported in detail with text illustrations. As to the etiology, the various theories are given, but the question is still open. Statistics show that female patients preponderate; the rôle of heredity seems assured. The author cannot confirm Habermann's recently expressed opinion on the causal connection between otosclerosis and syphilis. The next chapter treats of the functional examination, and importance is attached to Gellé's test. After describing the course and symptoms, mention is made of the many methods of treatment by way of the Eustachian tube and by operation, which have now all been abandoned; of the remedies given internally, phosphorus as suggested by Siebenmann seems to be the most promising. Finally the complete literature is appended.

This clear and unbiased exposition of an enigmatical disease is a welcome addition to otological literature.

A. K.

V. **Die Verletzungen des Gehörorgans.** (The Injuries of the Ear.) By Professor A. PASSOW, Berlin. Pp. 276. 1905.

The injuries to which the ear is subject are taken up in the following order of the individual parts: Auricle including a de-

scription of othematoma and perichondritis, external canal, drum membrane, tympanum with foreign bodies in the ear, Eustachian tube, mastoid process, labyrinth, and auditory nerve. The conditions are carefully described, with illustrations and personal observations, and the literature is cited. The chapter on labyrinth injuries is especially complete, and includes fractures of base of skull and labyrinth concussion. A chapter is devoted to hysteria and traumatic neurosis. In conclusion, the subject of accident insurance, which is receiving a great deal of attention at present in Germany, is treated.

The author's style is attractive and the presentation of the subject clear and thorough.

A. K.

VI. Die Eiterungen des Ohrlabyrinths. (On Suppurations of the Labyrinth.) By Professor E. P. FRIEDRICH, Kiel. Pp. 136. 1905.

The subject of labyrinth suppurations has received more attention in recent years, especially since the appearance of Hinsberg's excellent article (these ARCHIVES, Vol. XXXI., 1902). The basis of Professor Friedrich's investigations is furnished by twenty-seven personally observed cases from the Ear Clinic in Kiel, which are fully reported with temperature charts and eighteen plates illustrating pathological changes in the labyrinth. With full use of the literature the subject is treated systematically and thoroughly.

According to the author, the proportion of labyrinth suppurations may be expressed as one to every one hundred cases of purulent otitis. Infection usually passes through one of the two windows. A method of extension from the labyrinth to the skull, whose importance has been disregarded, is the passage along the aqueductus cochleæ. The clinical symptoms of labyrinth suppuration occupy an important part of the book. The treatment, which is of course surgical, intends to expose the purulent focus in the labyrinth and eradicate the diseased parts. In this we must be guided by the conditions found at operation. The opening up of the labyrinth is always dangerous, hence should only be undertaken when together with clinical labyrinth symptoms there are a fistula or granulations on the labyrinth wall.

The study of this book will be found most instructive and stimulating. The author has unquestionably advanced our knowledge of this important subject.

A. K.

MISCELLANEOUS NOTES.

Professor Karl Grunert died on September 25, 1905, at Halle a. S., Germany, in his fortieth year. His death occurred unexpectedly from the rapid aggravation of diabetes from which he had suffered some years.

In Otology Grunert's name has been closely associated with the Ear Clinic in Halle, which he has practically conducted in recent years, especially since Professor Schwartz's retirement from ill-health. His publications in the *Arch. f. Ohrenheilkunde* have been numerous and have been chiefly in the line of the surgical and clinical development of purulent ear disease and its endocranial complications. He recently published a monograph on the operation for *Jugular Bulb Thrombosis*, and together with Schwartz wrote an *Einführung in die Ohrenheilkunde*.

Grunert was particularly successful as a teacher; his courses of individual instruction have been especially popular with young American and English otologists, many of whom owe him a great debt of gratitude. As a man his good nature and fair-mindedness won him many friends. Otology loses in him an enthusiastic, hard worker, whose dominant aim was the elevation of his specialty.

A. K.

Professor Lucae, the director of the Berlin University Ear Clinic, celebrated his seventieth birthday on July 31, 1905. The day was marked by the usual ceremonies. Many friends, pupils, and delegates from various medical societies called to express their congratulations. A "Festschrift" was also presented, composed of numerous articles on otological subjects, the first being some very interesting reminiscences by Professor Schwartz.

Professor Politzer celebrated his seventieth birthday on October 1, 1905.

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